DOCUMENT RESUME

ED 164 595 TM 008 131

AUTHOR Valley, John R.
TITLE That's a Very Good Question: The Economic Impact of Credit by Examination.
INSTITUTION Educational Testing Service, Princeton, N.J.
SPONS AGENCY College Entrance Examination Board, Princeton, N.J.
PUB DATE 78
NOTE 146p.
AVAILABLE FROM Educational Testing Service, Princeton, New Jersey 08541 (no charge)

EDRS PRICE MF-$0.83 HC-$7.35 Plus Postage.
DESCRIPTORS *Advanced Placement; Bibliographies; *College Credits; College Placement; Cost Effectiveness; Educational Benefits; *Educational Economics; *Equivalency Tests; Higher Education; *Literature Reviews; *Research Needs; Testing Problems
IDENTIFIERS Advanced Placement Examinations; *College Level Examination Program

ABSTRACT

Three papers--by educational economists Kurt L. Kendis, Steven J. Klees, and Alan P. Wagner--independently examine the economic impact of college credit by examination (CBE) on students, institutions, and higher educational systems. Major issues are identified and further research topics are suggested. Kendis suggests the following results of CBE: changing enrollment patterns; increased teaching load of tenured faculty; increased needs related to services for nontraditional students, and administrative and data processing support; greater alumni support; greater student interest in attending CBE institutions; diminished need for financial aid; and modified recruitment procedures. He suggests that advanced placement for proficiency programs require flexibility from both students and schools. Klees lists a number of potential benefits of CBE, noting that what is beneficial to one party may not be beneficial to another--a student's saving of tuition results in less income for the university. Wagner examines the costs (both increased and decreased), as well as the benefits and problems for the student who graduates early, and for the student who receives credit and then enrolls for additional courses in a different area. He suggests further research studies and estimates their funding requirements. Extensive bibliographies are included in each paper. (GDC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED164595

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"That's A Very Good Question"

The Economic Impact of Credit by Examination

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Educational Testing Service
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

TM008 131

That's A Very Good Question: The Economic Impact of Credit By Examination Policies and Practices

John R. Valley

Director, Nontraditional Learner Support Services

Educational Testing Service

Copyright (c) 1978 Educational Testing Service. All rights reserved.

The project reported here is a study supported
by the College Board and conducted by
Educational Testing Service

Table of Contents

Preface . . . . . Page 1

The Issues. . . . . Page 1

Previous Research . . . . . Page 9

The Consultants' Recommendations . . . . . Page 13

Conclusions . . . . . Page 17

Appendix - Consultants' Reports

Kurt L. Kendis . . . . . Page 29

Stephen J. Klees . . . . . Page 85

Allen P. Wagner. . . . . Page 105

PREFACE

In the course of initiating this project the study director consulted many educational economists and other professionals assumed to have knowledge about or some interest in the topic of the economic impact of credit by examination policies and practices. At the outset such conversations almost invariably required a statement about the nature of the College Board's concerns and the reasons for these concerns. Many, if not most, of the conversations at the early stages, while courteous, were cool and lacked enthusiasm. As the study director elaborated on the concerns a bit there was a quick and very perceptible change of tone and response. When the significance of what we were trying to clarify through this project became apparent, universally the listener's response was "That's A Very Good Question!". Under the circumstances it seems like a very apt title for this report.

The purpose of these discussions with educational economists was to identify three consultants who would bring the perspectives of economics to credit by examination policies and practices with the view of their offering suggestions and recommendations as to how the College Board might advance greater understanding of these matters via studies or research. The description of the assignment provided for each consultant was identical and it included the following statement:

"The College Board, since the early 1950s via the Advanced Placement Program (APP) and more recently via the College Level Examination Program (CLEP), has sponsored the major national programs of credit by examination. The APP in 1977 reported results on 108,870 examinations by 82,728 students to 1,672 colleges. The CLEP in 1976-77 had over 93,000 candidates who took approximately 240,000 examinations*. The results of these examinations are transmitted to colleges and universities where in turn each institution makes its own decisions regarding the award of academic credit or advancement placement.

---

*In addition over 145,000 examinations were administered via the Defense Activity For Nontraditional Educational Support to persons in the military.

An activity of this magnitude raises questions of finance and economics in higher education about which relatively little is known. Does granting credit by examination affect income at a college or university? If so, in what way? If students gain financially by securing academic credit via examination, who, if anyone pays for these gains? What does a credit by examination program mean in terms of the cost to an institution to produce an undergraduate? If students coming out of high school are sufficiently well taught that they receive college credit by exam, does it cost the taxpayers less or more than conventional educational programs? Should taxes be used to subsidize credit by examination programs? These questions are but a few that illustrate the array and kinds economic-financial issues the College Board would like to explore.

The general problem is one of identifying the significant issues, ordering these into systematic relationships, developing analytic models that would permit studies to be undertaken to help guide institutional practice and public policy, and finally actually conducting such studies or providing guidance to institutions and agencies for the conduct of studies.

As a first phase, the College Board has asked ETS to engage one or more consultants to:

1. Explore the economic or financial implication of credit by examination so as to identify the issues, questions and contingencies.

2. Review, briefly annotate, and summarize whatever literature exists since 1955 regarding the financial impact of credit by examination.

3. Outline a study or an integrated series of studies to help clarify issues or provide answers to some of the key questions surrounding the economics of credit by examination.

4. Provide a cost estimate(s), a schedule for undertaking and completing the work, and a statement of the resources required and available to undertake the study(s) referred to in three above.

This work is to be undertaken from the perspective of credit by examination as it impacts upon individual institutions, on students who may participate in such programs, or on the public at large meaning state education systems."

The three consultants who undertook this assignment are listed below together with the titles of the papers they prepared. The consultants worked independently of each other. Fortunately, the consultants gave titles to their reports which are not identical so that it is possible to differentiate their work not only by author's name but also by the titles assigned to each report. They are:

1. Kendis, Kurt L. Project For The Development of Studies Into The Economic Impact of Credit by Examination. December 15, 1977. 38 pp.

plus 48 page bibliography and a compilation of references from an ERIC search.

2. Klees, Steven J. The Economics of Awarding College Credit By Examination. January 1978. 18 pp.

3. Wagner, Alan P. The Economic Impact of Credit By Examination Policies and Practices: Identification of Issues and Implications For Research. December 1977. 43 pp.

This paper is a synthesis of the three consultants' works. The reader should understand that the author is not an economist, much less an educational economist. He brings to the individual and collective consultants' work the perspective of one interested in and reasonably knowledgeable about credit by examination particularly as this concept has been developed as a major programmatic effort by the College Board. The paper is organized into four major sections: Issues, Prior Research, Consultants' Recommendations, and Conclusions. Throughout the paper, CBE has been adopted as a convention to refer to credit by examination.

I THE ISSUES

The consultants identified and discussed different constellations of issues and they did so at different levels of abstraction. These differences support the wisdom of the decision to undertake this initial foray into the field by seeking more than a single person's perspective.

Klees dealt with the assignment almost exclusively from a macroeconomics perspective. In this respect his approach was quite different from that of the other two consultants. In addition Klees assumed that the readers of his paper, more likely than not, would be people who were not professionally trained in economics. Therefore, he calls especial attention to two primary economic paradigms which for simplicity can be referred to here as (a) the competitive market economics approach and (b) the Marxist economics approach. These three aspects of his analysis - macroeconomics, and the two different economics paradigms-results in his shaping issues quite dissimilarly than Kendis and Wagner.

A macroeconomic perspective puts the focus on the costs of CBE to the society as a whole and on benefits to society as a whole. It may not be clear whether Klees is or is not prepared to recognize the differential interests and stake of the individual, the institution and the state in CBE. However we can conclude he is saying that a total social perspective is the one that should guide any empirical investigation of the problem.

This view causes a peculiar kind of issue to surface, namely, what is the College Board's responsibility for encouraging, conducting, and supporting investigations at the level of abstraction of society as a whole? Klees also points out that economic analyses do not evaluate a single policy or practice. Rather the analysis is commonly an evaluation of a policy "...vis-a-vis alternative possible policies." In this instance the comparison is probably between CBE and the traditional ways of earning credit via

classroom based course work. Thus we need to be sensitive to a very delicate position in which College Board might find itself. On the one hand should the College Board use its limited research resources to directly engage in research which because it is focused on society as a whole transcends its membership? And on the other hand if the College Board finds the rationale for conducting broad socially oriented research on CBE, it then must ask how one of its programs competes in terms of social good with the central business of its constituent members?

There are alternatives, of course, to the College Board investigating CBE at the macro-level. One possibility is to completely ignore these concerns. However a do-nothing position clearly seems unwise given the College Board's clear identification with the two major programs of CBE in the country. On the other hand, the College Board could lend its influence to the encouragement of such research. It could actively bring the problem to the attention of sources for funding research and cooperate in macro-level research projects if these were undertaken and sponsored by responsible agents. Consideration should also be given to ways to interest professional economists in this area which to now they have ignored. Thus we have one perspective of a "very good question."

However we need to return to what Klees indicated about the presence of at least two paradigms in economics. This matter is not disposed of at all by dealing with CBE as a macroeconomic issue. Which theoretical orientations should guide such research is a second issue that Klees brings to our attention. He summarizes his discussion of this matter as follows: "In sum, the perspectives that various economists bring to an evaluation of credit by examination policies pose many questions concerning its social and private costs, effects and benefits. I think it is a mistake to believe

that any version of economics can resolve and select the "optimum" course of action to follow. What economics can do best is to provide some competing frameworks from which one can observe and evaluate actual and potential education practices." Klees' emphasis on this issue serves to warn us about studies previously completed or those yet to be undertaken. It counsels us to ask questions like, from what theoretical orientation was this work undertaken, how does this affect the kinds of questions asked, or why doesn't everyone see the problem the way we do?

There is no point in this synthesis to restating or rephrasing in new words the issues identified by each consultant. The issues are developed in the consultants' reports which are in the appendix. What follows are the major kinds of data that the consultants appear to regard as critical to understanding CBE policies and practices from an economics perspective. They are listed without elaboration simply because any reader reasonably attuned to CBE should easily be able to comprehend how and why these data would be economically important and relevant. However, as the reader confronts the following list of close to three dozen different aspects of the economics of CBE, his or her sensitivity to the intricacies of the economics of CBE should be increased.

1. Impact of CBE on instructional budgets:

    1.1 Does CBE lead to time shortening, i.e. lower instructional costs?

    1.2 What income is lost through early graduation or CBE generally?

    1.3 Does CBE cause desirable or undesirable shifts in enrollment?

    1.4 Does CBE improve retention?

    1.5 Does CBE require reallocation of instructional resources, change faculty load?

    1.6 Does CBE improve instructional quality?

1.7 Does CBE free faculty for research?

1.8 Does CBE result in more homogeneous groupings of student in courses - impact on learning?

1.9 Does CBE yield changes in high school programs?

2. Impact on program budgets:

2.1 What internal administrative costs are generated by CBE?

2.2 Does CBE increase numbers of nontraditional students who require special services?

3. Impact on non-instructional costs:

3.1 How does CBE affect the mix of students requiring financial aid?

3.2 Does CBE increase counseling costs?

3.3 Does CBE reduce opportunities for graduate student aid (i.e. teaching assistants) by reducing size of introductory courses?

3.4 Does CBE change recruitment costs?

4. Impact on students:

4.1 Does CBE lead to time shortening, lower investment costs, faster returns to student?

4.2 Does CBE influence choice of field of study and returns on investment in education?

4.3 Does CBE modify academic programs which students pursue?

4.4 Does CBE change the need for student support services, i.e. counseling, records, etc.?

4.5 Does CBE influence student's choice of institution?

4.6 Do different kinds of students respond differently to CBE opportunities?

5. Impact on states:

5.1 How does CBE affect whether a state retains or exports its graduates?

5.2 How does CBE influence access, or choice by categories of students with particular attributes?

5.3 Relative costs of CBE vs regular classroom instruction?

5.4 Do students use different programs of CBE differently, i.e. enrichment for APP, acceleration via CLEP?

5.5 How does CBE affect enrollment?

5.6 Does CBE reduce institutional subsidies?

5.7 Does CBE reduce expenditures for facilities?

5.8 Does CBE lead to faculty unemployment?

5.9 Can CBE be related to human resource redevelopment activities?

The consultants have also pointed out that the general issue may be studied as a cost-benefit analysis or a cost-effectiveness analysis. If the former then we need to recognize that costs and benefits shift depending upon the party of interest. For example, the students' saving of tuition means income is foregone by the institution. On the other hand, cost-effectiveness analyses may be needed with multiple assessments of effectiveness. For example, if a student can obtain credit for learning acquired previously, this may increase motivation, interest, and success in the courses the student does take. CBE may increase the student's interest in and potential for graduate work, lead to enrollment in a graduate program, its completion and greater earnings following graduation.

In general the consultants' papers do not treat differently the Advanced Placement Program vs the College-Level Examination Program. (Kendis does treat the programs separately but he stresses the differences mainly in a discussion of the recruitment potential of the two programs.) Given some very fundamental differences between the programs and the likelihood of real differences in (a) the characteristics of the students who participate in each, (b) the ways in which the two programs relate to secondary schools and (c) the responses of colleges and universities to them, it is surprising that the consultants do not deal with this matter in their discussions of

issues. For example, the consultants have indicated that CBE may influence the educational programming of students who participate and hence affect career fields and ultimately earnings. However, if the students who participate in APP or CLEP represent different sub-groups of the college going population in terms of previous learning opportunities, richness of educational experience, achievement level and aptitude for further education, then one may find CBE having differential impacts on the students and institutions involved in each examination program. Similarly we know that in general the AP Program involves secondary schools in teaching special college level courses. Conceivably the cost-effectiveness of this effort might be different than presumably in CLEP where, in general, schools do not engage in special instructional efforts. The author of this paper is not arguing these matters as conclusions but he is concerned merely that these possibilities not be overlooked.

To summarize the consultants' treatment of issues, they have made the following major points:

1. We need to be aware of the substantial diversity of behavior of CBE students and aware of the possible varying economic consequences of some of the more typical responses that students make to CBE opportunities.

2. An adequate economic analysis also implies a long range view that takes into account more than simply an immediate concern. It would extend to what happens to CBE students beyond college or university, and would include how the participants managed their careers or professional development.

3. The economic consequences of CBE are not uni-dimensional across institutions. Kendis, for example, asks us to consider the obvious classification of institutions ranging from two year colleges to complex universities, both public and private, and in addition the fact that CBE programs may be operated within institutional types as follows:

	Use CLEP	Use APP	Use Both
1. Credit by score.			
2. Credit by score and additional evaluation			
3. Placement only by score.			
4. Placement only by score plus additional evaluation.			
5. Conditional credit if additional course work is pursued			
6. Credit awarded but early graduation not possible.			

4. In addition to the various subsets of institutions grouped by CBE practices and policies, and the varying responses of students to CBE, we need to maintain an awareness of the individuality of the student participants. Some may be exceedingly gifted, some may be traditional college age students, some may be very mature adult students, some may be individuals with substantial family responsibilities, etc.

5. CBE, when studied from different economics paradigms, will be found to not only exhibit different issues, but also the importance of the issues will vary.

II PREVIOUS RESEARCH

The one place where all three consultants were agreed was in their characterization of previous research on the economics of CBE. In so far as this author can tell, they are familiar with the previous research and they do not dismiss it. Instead all three consultants indicate the previous work is very incomplete and that it has not dealt with the various ramifications and intricacies of the issues which the consultants have recognized with special sensitivity. More telling, however, are the consultants' views that some of the previous work is either inaccurate or that it tends to mislead. For example, one consultant commented on several studies as follows: "These estimates, however do not accurately capture the effects of CBE on the institutional budget." or "These estimates (of reduced subsidies by states of educational institutions because of CBE) tend to mislead because they implicitly assume time shortened degrees."

The reader who is interested in an integration of previous research with a discussion of issues should give particular attention to the paper prepared by Wagner. In that paper, variables important to the formulation of issues in the economics of CBE are identified and the author provides commentary on what research to date has to tell us about such variables.

The consultants acknowledge that the deficiences of previous research are not confined to CBE but they may represent deficiences regarding studies of the economics of education more generally. Klees writes as follows: "For example, if CBE policies allow a student to graduate and obtain a job earlier, then not only are the costs lower, but the benefits are higher (e.g., one more year of earnings and production). However, such estimates are not easy to make. It is not at all clear how education affects earnings and productivity, and even with adequate theory, it is difficult to separate

the empirical effects of all the various variables that affect earnings to arrive at the impact of particular educational experiences."

Since the consultants' papers stress that CBE may result in earlier graduation, it is of interest to note Leveille's* recent statement on this matter. "Many legislators and other policy makers think that a time-shortened degree is necessarily synonymous with a two or three year degree where at least a student should be able to complete his or her degree in less than four years. In many colleges around the country a student's normal length of time spent in obtaining a baccalaureate degree is four years. However there are notable exceptions. For example, in the California State University and Colleges, the average time for completing the degree was recently approximated to be 6.4 years. Thus, a time shortened degree may, in fact, take longer than four years but less than many institutional averages. In any event, since the large number of students require substantially longer than a four year period to complete their degree program, a critical variable in comparing the costs and program effectiveness of time-shortened degree programs with regular programs is the normal length of time factor."

Despite the insufficiencies of previous research, the consultants do not conclude that the economics of CBE cannot be adequately researched. Their reservations about previous research serves to foretell what one might expect them to say about research that is needed. It suggests that their position will be to urge studies that will enable one to tackle a series of questions in a variety of ways. However, the consultants do not believe we have a research base from which to go forward. This position is summarized by Klees as follows: "From the above review it should be apparent that existing research has not even scratched the surface in examining what are

*Leveille, David E. "Time-Shortened Degrees: A Return To Nostalgia." Alternative Higher Education, Vol. 2, Winter 1977. p. 168.

the costs, effectiveness, benefit, equity, or structural impacts of CBE policies. The scarcity of related publications in professional journals and of unpublished research is indicative of the lack of attention this issue has received."

III THE CONSULTANTS' RECOMMENDATIONS

As indicated earlier in this paper, one of the consultants (Klees) did not offer suggestions for future research although he did comment at some length on future research. Klees observed that economists, even if of similar perspectives, have studied educational issues other than CBE at considerable expense and not reached consistant results. However, he goes on to say that it would be important to conduct research from different conceptual and practical perspectives on CBE. He indicates that such competing efforts would not necessarily generate much greater expense if the competing groups agreed on the information to be assembled even though it would be analyzed and evaluated separately. He reports that this practice has been successfully followed in previous instances.

Kendis and Wagner offer suggestions for further research. On a couple of ideas it seems likely that they may have pretty much the same general notions although they differ in particulars. Let us turn to Kendis first and then to Wagner.

A follow-up study of CBE program participants. This suggestion is to mount a data collection effort focused on an adequate sample of students who had participated in CBE programs. In addition to basic information of a demographic character, data would be collected and then updated annually on pre-graduation work experience and earnings, the student's educational path (credits via course-work), details on CBE application, participation and outcomes, uses made of CBE, method of financing studies, postgraduate experience, attitudes toward enrollment, choice of school, field of study, alumni contributions. Presumably, although this was not stated explicitly, data from this survey would be used to make comparisons with non-CBE students.

Kendis also proposes a control group experiment in dissemination. This would be a project to survey students with varying knowledge about CBE and to relate this information to educational careers, earnings or eventual incomes, costs of education, etc. He also recommends an institutional survey of the utilization of credit by examination that would concern itself with total program costs of CBE including any added or expanded student services and administrative costs.

Finally Kendis proposes the development of three models. The first is a computer based model to help colleges and universities to monitor the enrollment consequences of CBE for the institution as a whole and by departments. The second model would study the needs - meaning financial aid and student services generally - of CBE students. The third is an analytic model to show the total costs and budgetary impacts of CBE. The purpose of model will be to assist institutions of different categories to analyze optimum CBE policy.

Wagner suggests four major studies. The first titled "Dimensions of Student Participation and Net Benefits" would seek to develop estimates of the net monetary benefits of CBE for students, institution and states under alternate sets of assumptions. Wagner is referring to a series of simulations. For CBE students, the study would look at tuition savings and increased earnings, for institutions and states it would look at lost revenue, for states it would look at public subsidy savings and student savings.

Wagner's second suggestion would seek to increase our understanding of student responses to CBE - i.e. enrollment, choice of institution, choice of field, acceleration, mix (credit by exam and attendance status) and retention. He proposes an integrated series of studies to address questions that now exist regarding how CBE relates to these variables.

Wagner's third suggestion is to focus on data about the differences in earning between those with CBE who graduate early and those who do not. His fourth suggestion is a study of institutional-faculty responses to CBE which is based on the observation that institutions vary in the degree to which they have embraced CBE. Therefore, he would like to expand our knowledge about what attributes are associated with the adoption of CBE at the institutional and state funding level.

Neither Kendis nor Wagner provided detailed proposals nor were they asked or expected to do so at this stage. Each has offered a general outline of several studies and they have done so at levels of generality that are not crystal clear in their approach, intended outcomes, or applications.

In a sense the consultants are a bit discouraging of further research efforts: Klees from the viewpoint of saying that there are diverse perspectives in educational economics and as a consequence we can expect to have difficulty getting people to agree on what are the significant questions regarding CBE, and Kendis who interplays institutional typologies (within which there may be diverse responses to CBE in terms of institutional policies and practices) and the student actors in CBE who themselves reflect great diversity and hence fall into numerous categories. He pictures a research matrix containing literally hundreds of cells on which we could focus attention. It is of interest to note that while Kendis mentions this point early in his paper, he doesn't specifically come back to using the idea in a conceptual framework or as a set of problems to be overcome. Perhaps he was overwhelmed.

A major point that emerges from the consultants' papers is that of the meagerness of our current state of knowledge about student behavior vis-a-

vis CBE coupled with a matching lack of information about the ramifications of CBE policies and practices. All of the consultants point out that to aggregate savings in institutional subsidies or to similarly aggregate losses in instructional income rests on the assumption that CBE students accelerate. Undoubtedly some do and with those that do what differences does it make? We don't know. Undoubtedly many CBE students do not accelerate. But what is the course of their further educational and career development? We don't know. Given these as well as other gaps in our present knowledge what should the College Board do to promote greater understanding? This issue is discussed in the concluding section of this paper which follows immediatedly.

IV CONCLUSIONS

There is nothing in the consultants papers collectively or individually to suggest that it is possible to arrive at "the" definitive answer regarding the economic impact of CBE. The reasons are quite clear. While CBE is a well understood educational concept, its implementation by institutions or how it is utilized by individuals is quite varied. Obviously the level or intensity of involvement in CBE varies substantially from one institution to another and perhaps from one time to another. For individuals CBE can mean no educational programming changes; educational program changes with or without acceleration; and a number of other possible consequences to the point of undergraduate degree completion and beyond, all with different financial implications.

Moreover, it is not hard to imagine changing the question slightly yet ever so significantly. Instead of what is the economic impact of credit by examination on institution X - could we not ask, what could be the economic impact of credit by examination on institution X? It is conceivable that the latter version of the question might be the more important one at a time when colleges and universities are examining all possible strategies for dealing with the shrinking traditional college going age group.

We can be guided toward some conclusions regarding research on the economics of credit by examination by considering the College Board's role vis-a-vis that of individual institutions. While there may be several criteria, the following suggest themselves as being particularly pertinent:

a. Since CBE policies and practices are determined at the local institutional level or in state systems, the College Board should assist institutions in the development, implementation, and evaluation of such policies and practices. Obviously the criterion implies a concern for the economic impact of CBE policies and practices.

b. Since higher educational institutions, policy makers, and the public at large identify the College Board as the sponsor of the major programs of CBE, it is reasonable to anticipate that these groups will turn to the College Board to advance their understanding of issues regarding the economics of CBE even though these issues may be local institutional issues. The second criterion concerns how the College Board can fill this role effectively.

Acceptance of the first criterion would call into question any College Board research efforts where the objective would be to seek a definitive answer in one institutional setting that could be applicable to other settings. Given the variability of all the considerations that can shape the economic impact of CBE in institutional settings, it seems unlikely that it would be possible to conduct case study investigations with the view of pooling results across institutions or developing data that could be generalized to other cases. However, the first criterion does, suggest that a very useful and important research role for the College Board would be to develop analytic models and to make these available to institutions that wished to undergrid their policy development with local data. Such analytic models would need to be characterized by sufficient flexibility so that the uniqueness of institutions could be taken into account. Kendis suggests three efforts to develop models and his suggestions are repeated here.

I. "A Model to Measure Internal Enrollment Impacts of APP and CLEP.

As a service to users, a computer based model should be developed to help colleges and universities monitor the enrollment ramifications of crediting programs. Components of the model would be:

a. Historical patterns of APP and CLEP awards and department specific enrollments.
b. Up to date tally of current enrollments and awards by discipline.
c. Projections of admissions pool credit applications.

d. Projection of under utilization of faculty or staff shortages by department.

For larger universities, measurement of graduate course enrollment would be part of the model. For smaller schools, an eye on the local 'competition would be worth the modeling effort.'"

II. "Model to Measure the Needs of Credit By Examination Students.

1. The financial aid component - since many students in APP and CLEP do not fit the standard needs analysis pattern, new tools to provide financial assistance should be developed.
2. Student Services - at what level of enrollment do residential requirements of a student body change? Is additional parking warranted? Must counseling services expand in the future?

By institutional type, a model can analyze enrollments to project these service needs and their costs. This model need not be computer based, but merely fit standard analytic tables."

III. "A Summary Analytic Model to Show Total Costs and Budgetary Impacts of Credit By Examination on Institutions.

Inputs	Outputs
enrollments	physical plant costs
crediting policy	net tuition effect
staffing requirements and allocation policy	personnel cost
administrative cost algorithm	ancillary benefits (recruitment model)
aid policy	additional services

The object of such a model is to analyze, for each category of institution, the optimum crediting policy - not so small as to lose competitive advantage and incur negative good will, but not so large as to disrupt faculty allocation and demand excessive services.

Refinements in the model could come with time, but an obvious goal is to stimulate limited or extensive credit policy to study financial impact. More than a heuristic device this model could serve an institutional planning role for a college or university."

Of the three modeling exercises proposed by Kendis, the third has probably more universal applicability to the interests of a broader spectrum of institutions. Therefore, it might be given priority. It would also seem helpful in developing this model, if especial attention was given to the needs of small liberal arts colleges. These institutions are less likely to have the resources to do the conceptual work implied by this kind of model building. Further many of these institutions are eyeing carefully the adult

student pool as one of their areas of future services development. The problem of crediting previous adult learning therefore looms as a special problem in these institutional settings. It is difficult to sense a general cost range for this project. Kendis placed it around $19,500 but he presumed data to be available from a survey for which he cited costs of about $9000 to $33,500 and several significant elements of costs were not included in these figures. By trying to interpolate Kendis figures, the author of this paper approximates these costs as falling roughly in the range of $45,000 to $75,000.

Wagner also offers a recommendation that is germaine to the criterion of the College Board assisting institutions in the development, implementation, and evaluation of CBE policies and practices. Wagner's Study No. 1 promises to assist institutions or state planning groups by simulating participation in CBE and thus being able to report what might be the anticipated student tuition savings and increased earnings, or the lost institutional revenue, or the public subsidy savings. Thus Wagner offers a suggestion that attacks the question what could be the economic impact of credit by examination given certain assumptions and conditions. Wagner also did not provide a total cost figure. However, the author of this paper interpreted Wagner descriptions of the study as being roughly in the neighborhood of $10,000 given his assumptions about the professional and support staff time that might be required for its execution.

Acceptance of the second criterion identifies a somewhat different packet of research concerns for the College Board. The second criterion raises such questions as how can the College Board help institutions or educational systems to identify and clarify the issues they should be encouraged to probe on their campuses, or within their educational systems? Further, how can the College Board encourage the development of broad

societal perspectives on the economics of CBE. The second criterion also anticipates that the College Board will be looked to for comment, criticism, perhaps endorsement under certain circumstances, of findings and conslusions of research conducted on the economics for CBE.

The research roles suggested for the College Board by the second criterion are two fold. By all means, the College Board should encourage the interest and involvement of educational economists in theoretical and practical concerns for the economics of credit by examination. In this regard there is a very fortunate byproduct that could be the result of the study reported here. That is, the report prepared by consultant Klees contains the basic ingredients for two papers or articles. In his report Klees has demonstrated a talent for translating many of the intricacies of economic theory into words that convey meaning for those not professionally schooled in economics. It would be useful to encourage Klees either to write for the College Board Review or to be featured at a College Board National Forum. Another possibility might be the colloquium being planned by College Board on credit by examination. In this regard he should be asked to highlight, mainly for educational administrators and policy makers, the ways that different economic paradigms give rise to different issues regarding the economics of CBE. The purpose to be served by this paper would be to increase the awareness of administrators and planners of the complexity of economic issues in CBE in the hope that they will become better informed and more questioning of analyses that are inadequate or incomplete. The second paper or article that Klees should be encouraged to write would be one addressed to professional economists with the objective of encouraging them and their graduate students to investigate various aspects of the economics of CBE. This paper should be publishable in journals of American Economics Association or American Educational Research

Association. Wagner and Kendis may also have material for articles in professional journals. Therefore, if they could like to draw upon the papers they produced for this report, it is recommended that they be allowed to do so.

The second criterion suggests a further research role for the College Board beyond that discussed immediately above. The College Board needs to set the stage for, and make possible investigations of the economics of CBE that transcend the data available to a particular institution. The consultants, for example, commented on the fact that relatively little systematic information is available regarding the behavior of candidates who participate in CBE. These gaps in our knowledge run the full gamut of how CBE does or does not influence a student's choice of college, how CBE influences the educational programming of students, how CBE influences the time students spend completing degree requirements, how CBE influences educational decisions and career outcomes beyond the undergraduate degree, whether questions such as these are answered differently for participants in the APP or CLEP, and whether questions such as these are answered differently for different categories of students such as traditional college age youths, mature adults, women, minorities, etc. The import of data of this sort can be seen in the consultant's observation about the reported savings in Florida due to CBE, where the issue turns on whether CBE students do indeed shorten their degree completion time significantly. Implied here is a need for a data base of significant information derived from a longitudinal study of CBE candidates.

Studies two and three of the Wagner report (1) and the first study (2) of the Kendis report could be a nucleus for developing the kinds of student

(1) Students Response to CBE Options and Students Outcomes.
(2) Follow-up Study of CBE Students.

behavior information that would seem to be useful for the College Board to have available. However, neither consultant was sufficiently explicit for this author to recommend the development of either set of suggestions into a full proposal. Further discussions and clarifications with Wagner and or Kendis would be a profitable intermediate step prior to a decision to seek a full proposal. What should be sought by way of research is a study or a coordinated set of studies that would provide a broad basis for understanding how CBE candidates differ in their behaviour from non-CBE students in terms that are educationally-economically significant.

With data from such studies in hand the College Board could contribute materially to advancing understanding of the economics of CBE. These data would make it possible to delineate specific issues that individual institutions might wish to investigate on their campuses. When published by College Board, these data would also make it possible for institutions that conduct local investigations to have some sense of whether they were focused on typical or very unusual circumstances of CBE. These data would also make it possible for the College Board to advise institutions on the likely applicability to their situation or research completed elsewhere.

It is difficult to provide a general indication of the anticipated cost of such a study(s). Apparently there are considerable flexibilities in design. To interpolate the consultant's rough estimates to try to nail down the end-points on a cost range is difficult. However, it would appear that expense in the range of $75,000 to $160,000 for work to be conducted over about a three year period is likely.

What to do about the consultants' recommendations which have not been covered by the above discussion? These include:

From Klees: The general notion of encouraging a diverse group of educational economists to tie into a common data base for the conduct of specific studies.

From Kendis: (a) A study of the effects of an information program on participation in APP and CLEP.

(b) Institutional Surveys conducted at the departmental level.

From Wagner: Institutional-Faculty responses to CBE.

These recommendations cannot be dismissed completely. Each suggestion seems to have some merits. However given the two criteria for identifying College Board's relationship to research on the economics of CBE, the suggestions offered by the consultants which have not been covered by the detailed discussion of this section of the report would seem to have a lower priority claim on the College Board's limited resources for research. For this reason the author of this report does not suggest that the College Board, itself, follow-up these suggestions in the near future.

One further conclusion, It is clear that this first phase of research by the College Board on the economics of CBE has identified three thoughtful and interested economists who can contribute to the College Board. By design they have operated independently of each other. It is recommended that an effort be made to harness their talents in a collective effort. That is, it is recommended that a meeting be arranged of the three consultants, and appropriate College Board and ETS staff. The agenda for this meeting would be to develop a College Board long term research strategy for the study of the economics of credit by examination. This report, including the three consultants' papers would become background materials for such a meeting. A deliberate effort should be made to make this a working meeting. It might extend for 1 1/2 days. The first half day would be focused on

background and an open discussion of the consultants' papers and this report. Then the group should be divided possibly into two work groups to formulate specific recommendations. For the last half day, the group would again function as a committee of the whole to consolidate recommendations into a single strategy statement.

If this last recommendation is accepted, it would be useful to include in the group Dr. Douglas Windham, co-director, NIE-Education Finance and Productivity Center located at the University of Chicago. He was approached to serve as one of the consultants for this project. With regret he declined because the assignment came at a most inopportune time. He was in the throes of organizing the Center. However, Dr. Windham was quite clear in expressing his strong interest in the problem and in suggesting that the resources of the Center might be useful to the College Board.

Further if this recommendation is accepted, it will be important to keep the size of the meeting to a small number. The author emphasizes that this meeting is seen as a working committee not only to generate general advice and counsel but to advance specific and practical recommendations. These objectives would be most difficult to attain in a large meeting.

To summarize, the following recommendations have been offered in this section of the report:

1. That steps be taken to encourage the community of professional educational economists to undertake studies of the economics of credit by examination.

2. That steps be taken to acquaint educational leaders, planners and policy makers with the complexities of the economic issues in CBE including those issues that arise because of a diversity of economic paradigms.

3. That steps be taken to develop analytic models that institutions can use to conduct local investigations of CBE.

4. That data be gathered and published to expand our understanding of the behavior of CBE students and the institutions they attend in so far as this behavior has economic implications or ramifications.

5. That a working meeting of the consultants who contributed to this first phase study be arranged with the view toward developing a long term strategy for College Board research on the economics of CBE.

Appendix

Consultants' Reports

Kurt L. Kendis . . . . . Page 29

Stephen J. Klees . . . . . Page 85

Allen P. Wagner. . . . . Page 105

Project for the Development of Studies Into The Economic Impact of Credit By Examination

Prepared for
Educational Testing Service

By: Kurt L. Kendis
Policy Analyst/Systems Analyst
Office of the President
University of Pennsylvania
Philadelphia, Pennsylvania 19104

December 15, 1977

Summary and Conclusions

1. Despite continued and growing use of credit by examination; quantitative analysis of its effects, costs, and benefits demands a systematic and comprehensive study or series of studies measuring:

   a) the behavior of participants in school

   b) the impact on the institutions

   c) the resulting impact on the lives of the students

Most discussions and recommendations in this report will refer to and develop components for these follow-up studies.

2. APP and CLEP, as delivery systems for the concept of credit by examination, may require added flexibility in their utilization both by students and institutions. Future need for yet another delivery structure may be apparent as colleges and universities recognize credit and placement by examination as a powerful policy tool.

3. The institutional costs and benefits of credit by examination are considerable, yet often beyond the control of those administrators who foster the concept of greater articulation between a variety of educational systems. In attention to "quality" and "program" considerations demands the development of institutional tools to aid administrators in measuring internal financial effects of credit by examination, as well as controlling these effects. Likewise, new tools to maximize the use of APP data to develop new programs must be a future consideration.

4. Despite early indications that public involvement in credit by examination generates considerable savings to the states, all investigators add the caveat that additional study is clearly

indicated. They fear that declining enrollments may deviate these "boom-period" savings. They also admit to concerns of the academic community in the field of quality control.

5. The long range needs of the non-traditional learner and diversified educational systems must be met by credit by examination as an articulation device. Either the APP and CLEP systems must remain flexible, or comprehensive programs must be developed with the knowledge gained through evaluation of the follow-up studies recommended in this report.

Introduction - A Structural Overview

Neither higher education finance nor the implementation of credit by examination policy is homogenous. Consider, if you will, the standard delineation of institutional type and control (not including proprietary institutions):

	Public	Private
University		
4 - year		
2 - year		
community based		

For purposes of discussion one may categorize credit by examination programs by degree of implementation:

	Use Clep	Use APP	Use both
1. Credit by score			
2. Credit by score and additional evaluation			
3. Placement only by score			
4. Placement only by score plus additional evaluation			
5. Conditional credit if additional coursework pursued			
6. Credit awarded but early graduation not possible			

Thus each discussion in this report may contain 144 variants, depending on the institution to which the program applies. To disaggregate even further, one must consider the individuality of the student. A gifted high school student, a student returning from a year or more away from study, a transfer student, a foreign educated student, and an adult non-traditional student each have individual needs for which a credit by examination program will

differ. Likewise, the financial implications to be discussed could be considered to have more than 500 variants -- all subsets of the topics to be treated.

For purposes of organization, this report will have the following sections:

- Articulation in Higher Education
- Internal Financial Implications
  - Shifts in Enrollment
  - Teaching Loads
  - Additional Student Services
  - Administrative Support
  - Alumni Good Will
  - "Market" Advantage
  - Financial Aid
  - Recruitment
- An Individuals Financial Concerns
  - Incomes
  - Costs
  - Personal Enrichment
  - Tuition Discounts
  - Policy Effects
  - Project Proposal
- Public Support
  - Current Practices
  - Access and Choice
  - Employers and Public Policy
- Study Proposals
- Cost Quantification
- Delivery Systems
- Bibliography
- Appendix

Credit by Examination and the Issue of Articulation In Higher Education

The literature repetitively declares the need for empirical, qualitative benchmarks for the measurement of cognitive development throughout higher education. Sub-issues involve:

- transitions from secondary to post secondary
- transitions from 2 year institutions to 4 year institutions
- transfer among similar schools
- adult evaluation
- foreign study

The growth of APP and CLEP programs underscores recognition of the need for articulation, and thus many of the studies cited focus on these examination programs themselves. The goal of programs applying these measures -- efficient delivery of education without reducing the quality of the education. Fears of quality dilution following from the notion of warding of "cheap" degrees, rather than the systematic translation of experimental learning into formal credits.

The institutional need for articulation in admission policies, curriculum development, and guidance and career counseling is now an issue of 'who should establish the structure?' and 'by what way?' The efficiency of large national testing programs has been measured against the effectiveness of an institutional examination

program. The goal of the former is to reduce cost and the later is to ensure quality. This report does not recommend an extension of this dialogue beyond simple cost consideration.

Control of quality is a goal. The study proposals will emphasize measurement or verification of that quality. Since the focus of this report is economics by nature, the writer assumes no trade-offs exist between quality and cost from an institutional perspective. Academic quality, for purposes of this discussion, is static and constant, as is the need for articulation.

Whether or not various programmatic applications of credit by examination schema are cost-effective or cost efficient is a focus of this report.

Internal Financial Implications of Credit by Examination to College or University

For purposes of this discussion, one must consider a highly flexible credit by examination program -- one which may vary from year to year and from department to department. This report intends to promote the development of this flexibility as a policy tool, and discuss the financial implications which follow.

1. Shifts in Enrollment. Fields of specialization, though not always known at matriculation, may become overloaded or suffer too few students if attention isn't afforded the enrollment implications of awarding credit by examination. The financial burden of hiring additional academic staff in one field while underutilizing tenured faculty in another is certainly measurable. One may also associate the choice of area of concentration with earlier credit by examination eligibility for purposes of:

   a) planning manpower needs

   b) shifting crediting policy

2. Teaching Load and Faculty Tenure. With tenured faculty as a fixed cost, colleges and universities may find a need to accelerate eligible students into those courses most suited for the teaching skills of the older faculty members. This variable teaching load could either be analysed ex poste, or anticipated with a policy change. As always, the maintainance of academic quality would not be the issue, only a college or university's

recognition of cognitive skills.

3. Additional Student Services. With added credit by examination, the non-traditional learner may indeed comprise a greater portion of the student body. As noted at the 1977 ACE annual meetings (address by Susan Rink BVM, President Mundelein College), the added interest in evening hours necessitated extending the hours which all student facilities remain open. Registrar, business office, security, custodians -- all were needed as the student population shifted to more and more non-traditional students.

Career planning and placement services assume an added dimension with more non-traditional students. Even an additional service curriculum in learning strategies is now a necessity.

4. Support for Credit By Examination Itself. Administration of student data, evaluative material, test scores, and historical records will increase directly with an expanded crediting program. Institutions must anticipate these costs, as well as the time necessary to make thoughtful decisions. In the case where the APP and CLEP programs are not adequate for the institutions, one must then calculate the development and supervising of additional testing materials. This area is most sensitive to disaggregation by institution type and area of study; for many smaller speciality schools or department may need to do their own evaluation.

5. Alumni Good Will - As A Benefit With Rewards. One must state the obvious -- that a good credit by examination program will be looked upon favorably by graduates of the institution. To qualify

the positive influence on alumni or even corporate giving to the institution and then to isolate that share of giving attributable to a crediting program seems tenuous at best. But alumni giving studies are few and far between, and with future fiscal pressures mounting for colleges and universities, they will need the help of all of their former students.

6. "Market" Advantage in Higher Education. One category of utilization not enumerated in this introduction includes those institutions who do not recognize credit by examination at all. If one were to consider the "market" from which each institution draws its student body, it is obvious the eventual comparisons of institutions who award credit and those who do not will be part of the acceptance process. Anticipated costs could be reflected in increased net transfer loss (by department) or diminished admissions yield. An ever-increasing phenomenon is "slippage" in admissions, or the diminished number of students who actually martriculate each fall as opposed to those who say they intend to enroll. Since the summer is the period when credit by examination occurs, those institutions ignoring APP or CLEP will be susceptible to an increase in "summer slippage".

7. Internal Financial Aid Implications of Credit by Examination.

Without empirical evidence to either support or refute hypotheses concerning the financial needs of credit by examination participants, one must consider at face value these rather extended suppositions:

1. APP participants are, in the majority, from socio/economic backgrounds with greater available resources for higher education expenditures, either through personal and family assets, or by qualifications for funds awarded to cognitive skills.
2. CLEP participants are independent and have above-average means or access to capital to finance their educational costs.
3. The admissions and recruitment functions (sic. marketing) in colleges and universities may find credit by examination candidates a ready and willing market for their efforts.
4. One subsequent effect of additional APP and CLEP participants in the student population should thus be diminished financial need.

That portion of a student aid budget which impacts institutional funds -- either through direct awards or through administrative costs should diminish with additional credit by examination students.

Transfer admissions, often a pool of applicants with 100% of the students needing evaluation, will carry the same financial aid impact, but to a greater extent.

By targeting efforts toward APP and CLEP students, an institution can slow the growth of financial need while continuing policies emphasizing quality and admission without

consideration of ability to pay.

8. Credit by Examination As a Recruitment Device. Credit by examination as a college and university recruitment device is undoubtedly the least explored and perhaps the most potentially profitable dimension of the program. Literature on the subject is non-existent; the utilization of credit by examination in recruitment techniques and publications is rate and limited in scope. It is clearly virgin and fertile ground for cultivation.

The Advanced Placement Program offers recruitment opportunities at two levels: the obvious post-initial contact enticement and the less apparent use of the program to identify top students and secondary schools. Any college or university which participates in the Advanced Placement Program can easily and inexpensively present information about it in their publications, noting its relative advantages in such a way as to convert it into a recruitment device. The first step, assuming that the institution has developed a coherent and comprehensive Advanced Placement policy, is to investigate the AP policies of competitor schools, so that it is possible to differentiate it from theirs (without direct reference, of course). The next step would be to develop an Advanced Placement brochure which would be sent to all applicants or admitted students who are involved in advanced placement programs. By including a question regarding participation in the program in the admission application, they could either by hand-managed or computerized (depending upon the size and resources of the admissions office concerned). Admit letters could also be

personalized to include a paragraph regarding the opportunities available to AP students at the institution. In order to maximize the recruitment opportunity presented, a follow-up study should be undertaken to determine what the short and long range advantages of involvement in the program have been to the participating students at the institution concerned.

Another possible approach to post-initial contact recruitment would be to develop an on campus program for Advanced Placement students which consists of more than credit award and placement policies. Depending upon the nature of the institution concerned, the emphasis could be upon early graduation, early entrance into graduate study at the same institution, enrichment, research opportunities, or some combination of the preceeding. At least, the Advanced Placement program could be integrated, to some degree, into an existing general honors program, since the student overlap in the two programs would undoubtedly be significant.

The key to the approach to Advanced Placement as a post-initial contact recruitment device is knowing your own and your competitors' policies well, maximize the possibilities of your on campus program and insuring that your contacts and applicants share that knowledge. The limitation of this approach is that is is reactive. However, a further use of the AP program could be as a device to identify top students and schools. One could target AP high schools for recruitment by requesting a list of either the 3939 schools involved in the program or, say, the 100 schools producing the largest number of successful (by score) AP students.

The recruitment possibilities here are numerous: one could correspond with the guidance counselor and/or AP teachers and coordinator regarding prospective candidates and AP opportunities at the college concerned; one could seek out AP classes to address during school visits, one could invite AP classes to campus for programs, etc. Participation in an AP program could also become a criteria for competitive rankings of high schools by colleges, along with average SAT's and percentages going on to college.

Although it is not currently possible to do so, if ETS could make available the names and addresses of students who took AP Exams in May of the junior year, by score, colleges and universities could contact the students in whom they were interested. The major problem in using AP as a recruitment device is that most students do not take their AP exams until May of their senior year in high school, long after both they and respective admissions offices have completed their deliberations and made their choices The availability of junior year exam scores, similar to the CEEB Search approach, could ameliorate the situation.

The College Level Examination Program presents a similarly large number of recruitment possibilities. Here, again, there are two levels of response - reactive and outreaching. Certainly, information about participation in the CLEP program, or existing credit by examination possibilities could be provided in the recruitment literature. Indeed, the Florida legislature requires Florida State colleges and universities to include information regarding the CLEP program in all of its publications. Furthermore,

the use of lists of CLEP exam candidates could be published, should studies indicate that a signfiicant number of students took the exams before applying to college.

The largest single group of CLEP participants are in the eighteen-year old category, not the adult students for whom the program was developed. Certainly any policy which provides credit to these students on the basis of CLEP scores or alternate testing devices could be mentioned in the institutional recruitment publications. The issue of market segmentation is brought into focus by this group, however. There is some disagreement about whether traditionally educated eighteen year olds should be allowed to take CLEP exams, or if additional AP courses and exams should be developed to cover the newly emerging courses in the high school curriculum. Indeed, we need to study whether the AP and CLEP programs are appealing to similar or different groups of students and institutions. It is critical to the whole future of credit by examination that we separate the programs if that is how they are perceived, merge them if that is appropriate, or develop alternative testing devices if that is indicated.

Finally, there is one inherent danger in using credit by examination as a recruitment tool which should be outlined. One must be cautious not to dilute the quality of an institution's educational level or to jeopardize its reputation, by succumbing to the temptation of "buying" students by "giving" them credit for lower scores, especially in order to better a competitor's offer. A possible solution to that problem would be to have an

office in the institution, separate from the admissions office and, under faculty supervision, handle the development of policy and the awarding of credit. It is important to remember that if the credit by examination policies tarnish the college or university's reputation, the benefits of using credit by examination as a recruitment device are more than negated.

An Individual's Financial Effects -- Credit by Examination and Returns to Investment in Human Capital

Returns to investment in human capital, in the standard formulations, behave proportionally with some measure of "quality" and inversely with a quantification of "cost". To the individual student, then, a credit by examination program, whether an input of enrichment or acceleration, will increase the return of his investment in himself. Precision in these measurements is a project for future consideration, for "quality" and resulting income or satisfaction now assumes a new dimension when we manipulate time and cost. Cognitive development to induce an individual's income was often assumed to require a rather static input of 4 or more years at a tuition "price" and the opportunity cost of foregone earnings for that same four or more years. With an accelerated study program, these costs components are both reduced -- price, if less costs are incurred; and foregone earnings, if the student either accelerated his entrance into the labor market or avails himself of the opportunity to earn during his studies. Most important is the formulation for the adult or non-traditional learner, for whom the foregone earnings cost is a greater impediment to a return to schooling.

1. Effects on Incomes. The author of this report does not support the often popular notions concerning diminishing returns to investments in higher education. Standard measurement difficulties cloud the issue in the current literature, but when isolating the

students participating in credit by examination programs, the results are quite clear:

- The talented student attaining credit and advanced placement enriches his or her studies and entrance into professional training. Earlier and greater advanced training generates wages and salaries for these students, particularly compared to their incomes without consideration.
- Adult learners in pursuit of a degree often do so out of an employer-induced motivation in the form of an income increase.
- Spouses entering studies may enter the labor market where they had not participated in the past.
- Retraining or career changes, either to avoid a declining field or pursue a new endeavor should certainly experience greater incomes.

2. Effects on Costs. Absent in the human capital arguement in the literature is a discussion of the impact of education on personal finances. Whether the student is an adult who takes a course in consumer practices or a potential health professional finding the time to study investments -- the effects of additional education will be an increase in the individual's ability to handle his own incomes, expenses, assets, and debts. Again, the credit by examination student provides an isolated group of students for whom this behavior is typical.

3. Personal Enrichment. Job satisfaction, that qualitative

measurement which has thus far escaped hard empirical measurement, is often a motivation for credit by examination students to enter a study program. The economic effects are tangible, in that a person who seeks this degree of "satisfaction" may spend funds or time in its pursuit. Enriched or accelerated programs of study must, in the larger view, increase the inherent quality of the individual's life experience.

4. Quantifying the Student's Benefits -- As a Tuition Discount. To transcend the variety of programs and applications of credit by examination, and to hold academic quality as comparable from one institution to another ceteris parabis the "discount" awarded to students is the difference in tuition charges incurred to attain the degree or complete the program of study. If there is a time component, then living expenses for the period saved due to accelerated studies must be included, net of travel required or additional charges.

Discount to Student = hypothetical cost of studies
- accelerated tuition costs
+ savings in living expenses
- additional expenses (child care, travel)

This is a budget calculation involving alternative choices of educational programs offering credit or no credit by examination.

5. Dissemination and Credit by Examination Policy. Important in the analysis is not that a discount exists, but that the individual student would do when or if he knew of this discount.

Again, this writer places greater importance on the entire program surrounding the credit by examination system. For any given institution there exists optimum dissemination, recruitment, and counseling strategies best suited for students. Successfully implementing one component of the program -- awarding of credit -- without counseling students may impact that students ability to take advantage of the program.

Project Proposal

1. As a component of the follow-up procedures for credit by examination students, a measurement of costs and incomes of participants surveyed will yield some standard patterns or models of the effect of credit by examination.

2. Surveys of institutions will outline standard dissemination policies, and the effect of these policies on the experiences of the students in these institutions.

3. With participation of career planning professionals, additional models or concepts must be developed to envisonage all possible uses of credit by examination to enhance a person's career path.

4. These concepts can be assembled into three types of documents:

   a. A guide for students to be a part of the APP and CLEP service. This guide will focus on the economics of credit by examination and its practical applications.

b. Preparation of analytic tools for institutions to use when studying or surveying their own student populations or potential student markets. These models would show what educational and training needs apply to their own programs.

c. Preparation of outline dissemination materials for the schools themselves to utilize in a complete "program" approach to credit by examination. These guidance materials would, again, emphasize the economics of enrichment and acceleration of programs of study.

The above project is not in the scope of the study recommendations of this report (see section of studies), but follows from the discussion of issues.

Public Support for Credit by Examination

1. Current Practices.

This discussion is predicated on the assumption that the fundamental aim of government involvement in education, whether at the city, county, state or national level, is to produce the best education for the lowest cost. It is the combination of quality and economy which should guide public support for credit by examination -- not a concern for maintaining a bureaucracy or filling classrooms.

Clearly the governmental interest evidenced to date in the College Level Examination Program has been largely, if not entirely, by state governments, and their intent has been uniform -- to reduce costs to taxpayers. Furthermore, in cases where state-affliated college or university administrators are discussing the merits of the CLEP program, they too stress the economy of the program as compared to classroom instruction. But, is that the only measure of the economy of credit by examination?

The State of Florida is by far the leader in public support for credit by examination; indeed, a 1973 state statute requires each university in the state university system to offer CLEP examinations (or their equivalents) at least once a year and to give full credit for satisfactory performance. Thomas E. Furlong, Jr., who just completed a dissertation for which he surveyed Florida college and university administrators, found, among other things, that they feel that both the state and the individual students were saving money because of their involvement

in the CLEP program. Furlong questioned the correctness of their perception, because he fears hidden costs, as well as a tendency among students not to use the CLEP credits to graduate early. He is pleased that the state is reviewing the whole issue in order to develop more sophisticated legislation.

Administrators from the Illinois Community College Board, the City Colleges of Chicago and the University of Illinois have all presented papers which extol the virtues of credit by examination as a state tax dollar saving device. However, each of them indicates a need for more definitive research in order to assess the impact of credit by examination on institutional and state finances. Stallings, Aleamoni and Heil, of the University of Illinois, also call for test validation. Indeed, a hint of fear for quality dilution is discernible in every piece.

Based on the state of the literature one can only assume that some states and state institutions have fallen prey to the lure of a fast buck. Epitomizing this is Jimmy McCluskey's description of CLEP at Arkansas State University. He gleefully exclaims that because ASU is a national test center and is therefore reimbursed by ETS for most of the costs of administering the program, credit by examination is quite nearly a boondoggle. It is certainly time to question these assumptions, presumptions and simplistic cost analyses.

New York State has become involved in the most extreme form of credit by examination in its Regents External Degrees and Empire State College, neither of which "schools" have campuses:

graduation can be accomplished solely through credit by examination and transfer credit. As the furthest extension of the credit by examination concept,these programs provide fascinating research opportunities. Another New York program, Project Advance, adds still another dimension to the articulation of high school and college, as an alternative to the Advanced Placement Program. Syracuse University and New York State have developed this special program which permits high school seniors to take courses in the high school setting but sponsored by the University. Similar programs have developed in California, Connecticut and Utah, as well. These high school college cooperative programs seem to have developed in lieu of public support for the Advanced Placement Program. Only Pennsylvania (1963) and Ohio (1964) have dabbled in recommendations regarding Advanced Placement programs in state secondary schools; nothing of substance seems to have resulted from them. It is probable that one factor in the lack of public support of the AP program is that it is perceived, primarily because of necessarily reduced class size in AP courses, to be more expensive than regular honors programs. One is unlikely to unearth a single study which questions the quality of the Advanced Placement program, however, and it is well accepted by even the most selective colleges and universities in the country.

2. Study Implications.

The question of financial implications at the state level caused by credit by examination requires a thorough cost analysis by institutions and by states as wholes, investigated via surveys. We may well be surprised by the result. CLEP may not be as economical as all have assumed, if students are not utilizing it to graduate early; Advanced Placement Programs at the secondary school level may not be as expensive as currently thought if AP students go on to state or state aided colleges and universities and use their AP credit to accelerate their undergraduate degrees. Furthermore, the impact of the declining birth rate must be factored into the costs/benefits of credit by examination. Under-enrolled community colleges may not be as receptive to CLEP; smaller class sizes may make AP programs more feasible. A recession economy and a declining birth rate present both difficulties and exciting challenges to the educational profession. Using credit by examination as a catalyst, perhaps we can approach the future innovatively and increase the quality of education while decreasing its cost, not despite but because of fewer students.

3. Public Policy and The Issues of Access and Choice in Higher Education.

Although to date the states who develop, sponsor, and promote (but mostly subsidize) credit by examination do so with large scale, major programs. Often motivation is cost savings -- sometimes attention to the adult learner, but somehow negated in the discussion is the longstanding public committment to increasing every individuals access and choice possibilities in higher education.

One need not hypothesize cases of individuals (often labeled "non-traditional") who feel that they are not eligible even for admission to much less aid for higher education. The goals outlined in the FIPSE project Making It Count, of reducing informational inefficiencies are applicable to credit by examination where clearly the existence of these credit programs enlightens potential students as to their matriculation and/or aid eligibility.

4. Study Proposal.

When does credit by examination access and choice, and by how much? Surely, the follow-up study can include questions to measure what percentage of credit by examination participants were enlightened or informed of admissions and aid eligibility. More importantly, a sample or samples of non participants could certainly indicate the need for credit by examination programs.

The most obvious public role could be for dissemination of the concept of credit by examination. Were the general potential non-traditional population fully aware of credit by examination, then the public responsibility is met. It is not within the scope of this report to propose inquiries into public attitudes, but surely a major public program in credit by examination would include such a survey.

5. The Unemployment Benefit to Higher Education - And the Role of the Employer And Public Policy.

Public policy notwithstanding, increased unemployment in any given economic sector generally induces increase enrollments -- either for those unable to find a job or those unqilling to enter the labor market without the added "edge" they feel more education will give (see Steven Dresch "The Unemployment Benefit To Post-Secondary Education" I.D.E.S. New Haven 1976).

Employers, likewise, often utilize slack periods to offer additional training opportunities to employees. Since transfer payments are often borne by employers anyway, one financial impact of an economic downturn could be increased enrollments -- if the study programs were available and well known.

Interaction between schools offering credit by examination and employers to tailor programs to meet professional needs as well as accelerate studies to abtract students who other wise would be counted as unemployed should be a goal of public policy.

An effective use of tax dollars could promote this interaction through:

A. A study showing the relative cost to the employer of laying off and rehiring (and often retraining replacement) personnel as opposed to their entering a program of study while working full or part-time.

B. Public efforts at increasing this type of interaction between schools and employers.

C. Public subsidies to retrain marginal workers who might take advantage of credit by examination.

The above discussion certainly considers the project surplus of elementary and secondary teachers as a prime candidate for public support for credit by examination. Although this is a manpower allocation issue, certainly public education inducements, subsidies, or information dissemination programs would focus on the use of credit by examination.

Study Proposals

A. A Fundamental Follow-Up Study of Credit by Examination Students.

The preceeding sections on articulation, public support, internal institutional effects, and personal economics demanded additional empirical evidence to quantify cost, benefits and behavioral implications of credit by examination. This section delineates those areas of investigation under the scope of a follow-up of previous program participants. The design of the study is for eventual longitudinal application -- with the basic core of data updated annually. The sample size should be determined as necessary to assure validity and reliability of the data [see cost estimation material] distinct categories of questions must appear.

1. Socio/economic/demographic background. As in the basic S.D.Q. data, with frequency distribution responses.
2. Pre-graduation work experience, and earnings.
3. Educational path, or number of credits obtained through coursework over time.
4. Credit by examination participation, application, success.
5. Use of credit awarded - either enrichment or acceleration.
6. Methods of financing studies.
7. Post graduate work experience.
8. Attitudes towards:
   - enrollment

- choice of school
- field of study
- alumni contributions

The methodology would be a well constructed sample of student from APP and CLEP achieves. Every effort should be made to link data from ATP, CSS, or GRE programs on APP students for research purposes. Validity can be assured through a small (200) reliability study.

B. A Control Group Experiment in Dissemination.

Using current students or potential students, it would be useful to know the effect of an information program on APP/CLEP participation or even eventual educational or cognitive attainment. A project could be developed to survey students with varying degrees of knowledge about credit by examination generally, and then financial implications as described above. Then follow-ups could evaluate educational career, and earnings attainments of students with varying and quantifiably different knowledge of credit by examination possibilities.

The military, where DANTES annually tests potential students, could be fertile ground for controlled experiements in education. Again -- we wish to measure eventual incomes and costs as a function of the knowledge and eventual use of credit by examination.

C. Institutional Survey.

Further precision, disaggregated to the department level and year by year comparisons must be shown in the measurement of

utilization of credit by examination. With different schools selected by institution type and program participation, an annual tally of actual credits and placements resulting from CLEP or APP will aid cost analysis.

Studies exist, certainly, surveying institutions. A standardized, and comprehensive approach would gather data on all institutional uses and systematically sample costs incurred in representative groups of schools.

Cost reporting for those institutions undertaking their own testing system would provide additional analytic perspective. Total program costs, including additional student services and administrative costs will be the target of the in-depth survey.

D. A Model to Measure Internal Enrollment Impacts of APP and CLEP.

As a servcie to users, a computer based model should be developed to help colleges and universities moniter the enrollment ramifications of crediting programs. Components of the model would be:

a. Historical patterns of APP and CLEP awards and department - specific enrollments
b. Up to date tally of current enrollments and awards by discipline
c. Projection of admission pool credit applications
d. Projection of under utilization of faculty or staff shortages by department.

For larger universities, measurement of graduate course

enrollment would be part of the model. For smaller schools, an eye on the local "competition" would be worth the modeling effort.

E. A Model to Measure the Needs of Credit By Examination Students.

1. The financial aid component -- since many students in APP and CLEP do not fit the standard needs analysis pattern, new tools to provide financial assistance should be developed.

2. Student services -- at what level of CLEP enrollment do residential requirements of an entire student body change. Is an additional parking projections warrented? Must counseling services expand in the future?

By institutional type, a model can analyze enrollments to project these service needs and their costs. The model need not be computer based, but merely fit standard analytic tables.

F. A Summary Analytic Model to Show Total Costs and Budgetary Impacts of Credit By Examination on Institution.

INPUTS	OUTPUTS
- enrollments	- physical plant costs
- crediting policy	- net tuition effect
- staffing requirements and allocation policy	- personnel costs
- administrative cost algorythm	- ancillary benefits (recruitment model)
- aid policy	- additional services

The object of such a model is to analyze, for each category of institution, the optimum crediting policy -- not so small as to lose competitive advantage and incur negative good will, but not so large as to disrupt faculty allocation and demand excessive services.

Refinements in the model could come with time, but an obvious goal is to stimulate limited or extensive credit policy to study financial impact. More than a positive neuristic device, this model could serve an institutional planning role for a college or university.

Cost Estimates For Proposed Studies

1. The Surveys

For the student follow-up, the control group experiment, and the institutional study, the sample size will need to be estimated by a) the anticipated return b) the required statistical confidence level required c) the critical difference in mean responses between individuals in the survey. A statistical analysis will be required, but for purposes of cost estimation we will assume 5000 students to be surveyed annually, a control group experiment of 1000 population, and 100 institutions in the survey. Questionnaire development would require the equivalent of two man/weeks and survey design one man week for each. Verification of responses and a small reliability study could be included, as well as a budget item for telephone follow-ups for non-respondents.

Actual processing of questionnaires has been calculated using unit estimates from subcontractors in this writer's employ (see Appendix II). Analytic work and dissemination budget items corresond to previous work done at the University of Pennsylvania. A $5000 publication budget assumes a $4 unit cost with break-even implications.

Survey Cost Estimation Summary

	A	B	C
Questionnaire development	2,500	1,500	1,000
Survey design	1,000	1,500	500
Population size	[5,000]	[1,000]	[100]
Survey administration @ $3	15,000	3,000	300
Follow-up verification	1,500	500	500
Reliability test	1,000	-	-
Computer file support	2,500	2,000	2,000
Analytic work	5,000	2,500	2,000
Report preparation and dissemination	5,000	5,000	2,500
Estimated total direct cost	$33,500	$16,000	$8,800

The above table is designed to display approximate budgets for surveys of the indicated size. To estimate total project cost, an additional estimate for indirect costs is necessary. Often research of this nature requires 22% of the direct costs as a budget approximation. These estimates do not include any travel or possible public dissemination, which would be in the form of a seminar or conference.

2. The Models.

Three models are proposed -- one for enrollment planning, one for institutional cost projections, and a summary analytic tool as a cost benefit device. For Model D and F, the projects appear to similar to modularly developed interactive systems that

this writer has worked on in the past.

The enrollment model will contain a module, or separate set of programs for each department analyzed. A module involves ten man days of development @$250/day. If fifteen subgroups were standard in a college or university then model D would be:

Project design =	5 man days	
Modules for Departments	10 man days	
Admissions	10 man days	
Transfers	10 man days	
Synthesis	10 man days	
Historical analysis	10 man days	
Data base development	5 man days	
	60 man days @$250	
		$15,000
Report preparation		5,000
Estimated total development cost without including indirect cost, dissemination or publication		$20,000

The cost synthesis (model F) involves a different approach, for the computer work is more of an heoristic exercise. Using, for example, H.E.G.I.S. categories; the model could be a construct of an interactive input/output table to be perturbed for variations in crediting policy. Typically, a model of this type requires 6 man days, such that the whole project involves.

8 institutional types x 6 man days	= 48 man days
structural programming for interactive use	= 10 man days
total	58 man days
	x250
	$14,500
again, report preparation	5,000
total	$19,500

The model F, or a services model for institutional planning, involves utilization of the results of survey C (above). Each student service will be noted to have a cost corresponding to enrollment levels of non-traditional students. This writer finds this project infinitely flexible, such that the costs will vary with the dimensions of the tasks involved. At a later date, further specifications could yield hard dollar cost approximations.

Credit By Examination Delivery Systems
Are APP and CLEP Enough?

Demographic phenomina indicated considerable structural shifts in future college enrollments. Despite certain predictions of overall declines, this writer is among those confident that higher education can replace standard curriculum patterns with innovation and flexibility. A key to higher education's ability to respond to non-traditional educational approachs will be the evaluative and analytic tools which are available. Credit by examination requires just such innovative and flexible devices.

Studies of APP and CLEP programs, such as those outlined in the previous sections, will produce measures of the "success" with which higher education has used these examinations. Success can be measured in cost savings, career advancement, congnitive development, or overall satisfaction of the student. With results of this kind, the next phase of any comprehensive discussion of financial implications of credit by examination should not be constrained by the limits of the current programs.

Proposal: With empirical evidence in hand, are APP and CLEP as currently designed, meets higher education's future needs? Do the numerical evaluation offer enough distinction for hard and analytic applications? Can APP and CLEP overlap in a meaningful way. Can a delivery system be developed to permit institutions

to add their own components to the standard tests in a way which would maintain national comparability?

Most of the above questions demand, as a framework for discussion, some of the evidence which a comprehensive follow-up study of students and institutions will provide. The evaluation of alternative delivery systems is not within the scope of this report, yet is an obvious and logical consideration for the future.

A

Bibliography For

The Study of Financial Implications of

Credit by Examination

Part I - General Bibliography

Part II - Resources in Public Support for Credit by Examination

Part III - The Issue of Articulation and Credit by Examination

A General Bibliography for Study of The Financial Implications of Credit By Examination

Advanced Placement Candidates Enrollment Data 1976 Supplement Consortium on Financing Higher Education, January 1977.

Advanced Placement Enrollment Data 1960-1975 Consortium on Financing Higher Education, May 1976.

Apstein, Barbara, "Dangers of Credit by Examination" Educational Forum, March 1975.

Bowen, Howard, R. Investment in Learning, Carnegie Council Report, Jossey-Bass San Francisco, 1977.

Career Thresholds Volume 6 U.S. Department of Labor R & D Monograph 16 1977 pgs. 72-84.

College Placement and Credit by Examination in 1975 CEEB New York 1975.

Committee for Economic Development, The Management and Financing of College, New York: CED, 1973.

"Earn Your Degree. . .In Three Quarters Time" The National Observer, July 1, 1972.

Flaugher, Ronald L. "Credits by Examination for College Level STudies On Annotated Bibliography" CEEB 1967.

Glenny, L. et al, State Budgeting for Higher Education: Data Digest, Berkeley: Center for Research & Development in Higher Education, 1975.

Haag, Carl M., "Success of Advanced Placement Students in College Work".

Hansen, W.L., and Weisbrod, B.A., Benefits, Costs and Finance of Public Higher Education, Chicago: Markham Publishing Co., 1969.

Hills, John R., "Use of Measurement in Selection and Placement" in Educational Measurement ed. Robert L. Thomdike (22 ed. Washington American Council on Education, 1971).

Jamison, D.T., and Wolfe, B.B., "Assessment and Accreditation Economic Considerations," in Willingham & Nesbitt, eds., Implementing A Program for Assessing Experiential Learning. Princeton, N.J.: CAEL, Educational Testing Service, 1976.

Jamison, D.T. and Wolfe, B.B. "The Economics of Experimental Learning Programs" in FINDINGS, Educational Testing Service, Princeton, N.J., Vol. III, Number 1, 1976.

Jones, J. Quentin "Advanced Placement--Taking a Hard Look" NASSP Bulletin 59, 393, 64-9 October 1975.

Kelley, R.L., MacTaggart, J., and Spencer, R.A., Analyzing Costs in the Assessment of Prior Learning, CAEL Institutional Report, Webster College, Princeton, N.J.: CAEL, Educational Testing Service, 1976.

Kray, E.J. The Structure and Financing of a Program to Assess Experimental Learning. A practicum presented to Nova University in partial fulfillment of the requirements for the degree of Doctor of Education, 1975.

Kray, E.J. and Wyman, B.T. Policies, Procedures and Politics Affecting Experimental Learning. A practicum presented to Nova University in partial fulfillment of the requirements for the degree of Doctor of Education, 1975.

Kreplin, Hannah "Credit by Examination: A Review and Analysis of the Literature" Ford Foundation report P 20 July 1971.

Litwin, James L. and others "An Experiment in 'Less Time, More Options': A STudy of Accelerated University Students" Paper presented at the annual meeting of the American Educational Research Foundation (New York, April 1977).

McCluskey, Jimmy, "Financing Credit by Examination--Issues and Implications" Arkansas State University.

McCluskey, Jimmy and Mossie J. Richmond, Jr., "Summary Report on Arkansas State University's Participation in the College Level Program 1971-1975".

Meyer, P. Awarding College Credit for Non-College Learning. San Francisco: Jossey-Bass 1975.

Moughamian, Henry "Financing Credit by Examination: Issues and Implications" City Colleges of Chicago, October 26, 1976.

National Commission on the Financing of Post-Secondary Education, Financing Post-Secondary Education in the United States, Washington: U.S. Gov't. Printing Office, 1973.

O'Hearne, J., "New College Scholarships - Rewards in the Coin of the Realm," College Board Review, No. 83, Spring 1972, pp. 22-24.

Soloman, R.J. "Giving Credit Where Credit is Due" Educ. Rec. 51.3, 301-04 Summer 1970.

Stallings, William, M., Lawrence M. Aleamoni, and D.K. Heil "The University of Illinois Placement and Proficiency System: Description and Results, Journal of Higher Education, 1972, Vol. 43, No. 8.

Suprina, Richard N. "The Changing Twelfth Grade" Speech given before the annual meeting of NASSP (Washington, D.C., February 13-18, 1976).

Tully, G. Emerson "Credit by Examination and the Professional Development of Vocational Education Teachers" Florida State Department of Education, April 1977.

Willingham, W.W. and Geisinger, K. Critical Issues and Basic Requirements for Assessments Chapter 13 in Keaton & Associates Experimental Learning, San Francisco: Jossey-Bass.

Bibliography:

The Issue of Articulation and Credit by Examination

1. Archer, J. Andrew; Nickens, Harry C. "Credit by CLEP: A Disconcerting Look at a Good Idea" Community College Research Quarterly I, 2, 179-90, Jan./Mar. 1977.

2. Blackmer, Alan et al. General Education is the School and College: A Committee Report of the Faculties of Andover, Exeter, Lawrenceville, Harvard, Princeton and Yale. Cambridge, Mass. Harvard Univ. Press, 1952.

3. Burnham, Paul J.; Hewitt, Benjamin A. "Advanced Placement Scores: The Predictive Validity" Educational and Psychological Measurement, 31, 4, 939-45, Winter 1971.

4. Burnham, Paul J.; Hewitt, Benjamin A. "The Rock Stands, Mr. Noyes" College Board Review, 83, 25-29, Spring 1972.

5. Carine, Edwin T. "Credit by Examination Games: Journal of NACAC, 21, 1, 24-25, July 1976.

6. Carnegie Commission on Higher Education, Less Time, More Options: Education Beyond the High School New York, McGraw Hill, 1971.

7. Carnegie Commission on Higher Education, Continuity and Discontinuity: Higher Education and the Schools New York McGraw Hill, 1973.

8. Casserly, Patricia L. "What College Students Say About Advanced Placement" Parts I and II. College Board Review, Fall, 1968, No. 69, pp. 6-10; Winter 1968-69, No. 70, pp. 18-22.

9. Casserly, Patricia L. "College-Level Examination Program, Its Meaning to Participants" College Entrance Examination Board Research and Development Reports, RDR 72-73, No. 6 Princeton, N.J., Educational Testing Service, 1973.

10. Commission on Non-Traditional Study, Diversity by Design San Francisco, Jossey-Bass, 1973.

11. Connecticut Commission for Higher Education. Improvement of Opportunity: Alternative Approaches for Delivery of Higher Education Services, Report of Research Groups, February 1973.

12. Darnes, G. Robert The Articulation of Curricula Between Two and Four Year Colleges and Universities, Florida Univ., Gainesville. Institute of Higher Education, September 1970.

13. Eades, Joe C. "Starting Where the Student Is: An Experiment in Accelerated Graduate Work Education" Journal of Education for Social Work, 12, 3, 22-28, February 1976.

14. Flaugher, Ronald L. Research on the Controversies Around Collegiate Placement and Credit Systems. Princeton, N.J. ETS, May 1973.

15. Fry, Dale Eugene A Comparison of College Performance in Calculus Level Mathematics Courses Between Regular Process Students and Advanced Placement Students, EdD Dissertation, Philadelphia, Pa. Temple University, 1973.

16. Gillmore, Gerald M.; and others. A Study of the Educational Benefits of Proficiency Testing for Students. Research Report No. 354. Illinois Univ., Urbana. Office of Instructional Resources, May 1974.

17. Grandy, Jerilee; Shea Walter M. The CLEP General Examination in American Colleges and Universities. Princeton, N.J., ETS 1975.

18. Greaves, Fred. School and College Cooperation: A Report on an Experimental Project in Concurrent Enrollment. Research Report 8. Salinas Union High School District, California, May 1974.

19. Hanson, Emil Otto An Investigation of the Validity of the CLEP's General Exams: A Review of Related Issues in Higher Education. Ph.D. Univ. of Utah, 1973.

20. Hefferlin, J.B. Lon. Avoiding Cut-Rate Credits and Discount Degrees in K. Patricia Cross, John R. Valley and associates Planning Non-Traditional Programs: An Analysis of the Issues for Post Secondary Education. San Francisco; Jossey-Bass 1977.

21. Hochman, William R. "Advanced Placement: Can It Change With the Times?" College Board Review. 77, 16-19, Fall 1970.

22. Jones, J. Quentin Advanced Placement - Taking a Hard Look. NAASP Bulletin, 59, 393, 64-9 October 1975.

23. Kimmel, Ernest W. "Financing Credit by Examination: A Framework for Discussion, October 1976 paper, ETS.

24. Kintzer, Frederick C. Articulation and Transfer Topical Paper, No. 59, Los Angeles, California, UCLA; December 1976.

25. Knoell, Dorothy M. and Medsker, Leland L. From Junior to Senior College: A National Study of the Transfer Student ACE, 1965.

26. Kreplin, Hannah Credit by Examination: A Review and Analysis of the Literature Ford Foundation Report, July 1971.

27. Litwin, James L.; and others. "An Experiment in "Less Time": A Study of Students Accelerated to Junior Status." Journal of College Student Personnel, 16, 6, 499-503, November 1975.

28. Menacker, Julius From School to College: Articulation and Transfer Washington, D.C. American Council on Education 1975.

29. National Association of Secondary School Principals College Courses: A Twelfth Grade Option. Curriculum Vol. 5 No. 2 Roston, Virginia, December 1975.

30. Polgar, Ellen The California High School Proficiency Exam June 1976.

31. Schroeder, Lee L. A Note on the Probability of Errors in Decisions Based on Tests of the College Level Examination Program.

32. Sharon, Amiel T. "A Model for Awarding College Credit for Work Experience" Journal of Higher Education, 47, 6, 701-10, Nov./Dec. 1976.

33. Shaw, Jane S. "Speeded-up, Souped-up and Skip-a-Year Programs: Kid Get Into-and-Out-of College Sooner" Nation's Schools and Colleges, 1, 2, 35-42, October 1974.

34. Smart, John M; Evans, Charles. "State Policymakers and Time-shortened Degree Programs" Journal of Higher Education, 48, 2, 202-15, Mar./April 1977.

35. Smith, Philip L; Kubik, Jan B. "Attitudes of Professional School Deans Toward Accelerated Undergraduate Degree Students" Journal of College Student Personnel, 17, 1, 39-42 Jan. 1976.

36. Solono, Cecilia H.; George, William C. "College Courses and Educational Facilitation of the Gifted" Gifted Child Quarterly 20, 3, 277-85, Fall 1976.

37. Stecher, Carl A. "CLEP and the Great Credit Giveaway" Change 9, 3, 36-41, March 1977.

38. Tully, G. Emerson, "Credit by Examination As Seen by Secondary School Teachers and Coordinators of Accountability in Florida" Paper presented at the Southern Regional Meeting of CEEB, February 1976.

39. Wilbur, Franklin P.; Chapman, David W. The Transferability of College Credit Earning During High School. College and University 32, 3, 280-7 Spring 1977.

40. Willingham, Warren. College Placement and Exemption. New York, New York, CEEB 1974.

Bibliography:

Public Support for Credit By Examination

1. Angermann, Gerhard O.; and others. Guide for a Comprehensive College Advanced Placement Program in Pennsylvania. Curriculum Development Series, No. 1 Pennsylvania State Department of Public Instruction, Harrisburg, 1963.

2. Caldwell, Edward "In College Effects of Acceleration by Examination" Journal of College Student Personnel September 1977.

3. Chapman, David. Project Advance Evaluation. Syracuse University Center for Instructional Development. Jan. 1976.

4. Connecticut Commission for Higher Education. Improvement of Opportunity: Alternative Approaches for the Delivery of Higher Education Services. February 1973.

5. Ferrin, Richard I.; Willingham, Warren W. "Practices of Southern Institutions in Recognizing College Level Achievements" Higher Educational Surveys Report 3 CEEB December 1970.

6. Furlong, Thomas E. Jr. The Perceptions of Selected Groups of University and Community College Administrators of the College Level Examination Program and Implications for the State Universities and Community Colleges of Florida. Ph.D. Florida State University, 1977.

7. Harden, Harold D. Military Credit: A Study Educational Research and Development Center, University of West Florida, Pensacola, Florida, May 26, 1976.

8. McCluskey, Jimmy and Richmond, Mossie J. "Summary Report on Arkansas State University's Participation in CLEP" 1971-1975.

9. Moughamian, Henry "Credit by Examination at an Urban Public Community College; 1976.

10. Ohio Council on Advanced Placement. Advanced Placement in Ohio Ohio State Department of Education, Columbus 1964.

11. Stallings, William M., Lawrence M. Aliamoni and D.K. Heil "The University of Illinois Placement and Proficiency System. Description and Results" Journal of Higher Education, Vol. 43 No. 8.

12. White, Darrel K. "Acceleration for Gifted, College-bound Students" College Board Review, 93, 7-9 Fall 1974.

13. Twitchell, Theodore G. Advanced Placement Program at Palo Verde College 1968.

THE ECONOMICS OF AWARDING COLLEGE CREDIT BY EXAMINATION

by

STEVEN J. KLEES
January, 1978

This research was supported by Educational Testing Service. The viewpoints expressed are those of the authors only.

I. INTRODUCTION

In this paper I examine the policy related issues and questions that derive from applying an economics perspective to the increasing use of awarding college credits by examination (CBE). The intent is to see what the issues are, what research has been done relevant to these issues, and what type of additional research may be useful. Clearly college credits have traditionally been awarded by using examinations to test the knowledge gained by the student through formal course enrollments. However, in recent years there has been considerable attention devoted to means of rewarding prior formal or informal college level learning, often through the use of examinations, and the implications of this practice for post-secondary education may be substantial.

Over the past two decades economists have been devoting greater attention to education as an economic activity, since both their theories and empirical studies have indicated the potential importance of education to the economic well being of the individual and the society as a whole. Much of this economics of education framework and literature is relevant to looking at CBE, as we will discuss below. However, in order to understand the approach of economists to CBE one must understand the way in which economics analyzes social phenomenon. Moreover, economics is not unidimensional--there are different economics paradigms and the different paradigms have different implications for the evaluation of CBE. Not only may the answers to policy questions be different from different perspectives, but the issues and questions that are raised may be different as well. Policy issues do not arise in a vacuum, but are generated by the perspective taken by the policy making structure and individuals. Thus it is important for policy-makers to seek new angles of vision in order to improve their ability to make wise decisions and even to ask the most important questions. It is with this objective in mind that this paper has been written. It is not so much that the frameworks of economists raise new issues, although they do raise some, but that they provide a means of organizing and evaluating many of the issues that have been raised with respect to CBE in a more comprehensive fashion.

In Section II below I first briefly discuss the primary economics paradigm that is in use in the Western world, its approach, shortcomings, and at least one alternative to it. In Section II.B I look at the policy related

questions and issues concerning CBE that are raised from these perspectives. The literature relevant to these policy questions and issues is then reviewed in Section III. Finally, in Section IV future research possibilities are explored that may shed light on unanswered CBE policy questions.

II. ECONOMIC ISSUES

A. General

The main thrust of economics in the Western world over the past two centuries has been the examination of the operations of social systems based primarily on competitive markets to allocate scarce resources. Building on Adam Smith's The Wealth of Nations (1776), economics has become a study of how the private and public sectors should allocate their resources in order to achieve some sort of overall social optimality or efficiency. The basic thesis is that the prices of a resource, good, or service, determined in a perfectly competitive marketplace by the forces of aggregate demand and supply, is a valid measure of the value society attaches to that particular resource, good, or service. If this is true such economists argue that the private sector, allocating resources according to the criterion of profit maximization, will operate in the best interest of society, producting the most valued goods and services at the lowest possible cost.

Of substantial interest to economists and policy-makers, especially over the past decade, is how to get the public sector to fulfill this conception of social efficiency in its operations. This concern has led to the formulation, development, and wide-spread application of cost-effectiveness and cost benefit analytical techniques for determining "socially efficient" public sector courses of action. Both types of analysis focus on the costs of resource use as a critical element in decision-making. Cost to an economist is the value placed on what is given up (i.e., opportunity cost) by devoting resources to one activity instead of another, which in a perfectly competitive economy is measured by the prices of all the resources used. Although costs can be considered from the perspective of any particular individual or group, the competitive market economist's concern is usually with costs to the society as a whole.

In order to make sensible social decisions from such an economics perspective, one must combine this analysis of social costs with an analysis of the value society attaches to the outcomes of the activity in question. According to this

social cost-benefit calculus, public sector decision makers should choose those policies that maximize the social gain, i.e., the difference between social benefits and costs. Since most public sector activities result in outcomes that are not sold at the "marketplace," it is often difficult to estimate benefits in monetary terms, although much economist ingenuity has gone into trying to do so. If it is impossible to value all the outcomes of an activity in a monetary metric, such economists turn to cost-effectiveness analyses to yield a more limited conception of efficiency as a guide to decision choice. With cost effectiveness analysis, you determine the effects of alternative courses of action and choose that alternative that gives either the highest effectiveness for a given cost, or the minumim cost for a given level of effectiveness. However, since any public sector activity usually involves many different outcomes of social interest, choosing the most efficient course of action usually involves evaluating the trade-offs between different outcome dimensions. To discover socially valid measures of the value of these outcomes is difficult at best. Therefore economists strongly favor monetary cost-benefit analysis, even when it only partially captures the social value of outcomes, in order to yield clear-cut estimates of the degree to which the value attached to system outputs exceeds the value attached to system inputs.

In education these economics approaches have been applied to evaluating the costs, effects, and benefits of various types of educational activities. Monetary benefit measures have been utilized widely, based on the premise that educated persons are "sold" on the labor market, and thus one can estimate the social value (or a part of it) attached to some educational practice by analyzing (usually through regression analysis) its impact on individual earnings. The wages paid to an individual are assumed from this perspective to be a valid measure of the social value attached to his or her productivity, similar to the price of any other good. Combined with an analysis of social costs (including the very important cost of a student's time, which we will discuss below), this approach can yield quantitative measures of the social rate of return to particular educational decisions. Economists have also frequently applied cost-effectiveness to educational evaluation to determine the most efficient means of achieving such outcomes as greater cognitive learning, higher enrollments, higher graduation rates, or better student transportation.

Perhaps the most widespread criticism of the competitive market economics approach to private and public sector decision-making is its almost complete disregard of equity issues. Such economists see equity as a separable concern from efficiency; for the most part they believe the latter criterion is the one about which economics as a science can make pronouncements. Equity may be important from this perspective, as something that is valued by the society, but economists have no more right to decide what is equitable than any other individual. Moreover, even if equity is socially valued, such economists argue that decisions should still be made according to the efficiency criterion (i.e., choose the most socially cost-beneficial alternative), and that the financing of that activity can be arranged so as to make it equitable. (Better yet, many economists would argue, is to take care of equity concerns through the general public sector taxation mechanism, obviating the need to build equity concerns into every decision.) Nonetheless many economists have concerned themselves with the impact of various policies on certain dimensions of social equity (usually in terms of income and wealth), both because it is clearly an outcome considered to be of societal benefit and because the analytical techniques of economics are conducive to its examination. Thus, in education, some economists have been concerned with the costs incurred and benefits received by different individuals and groups. This examination is often used to provide policy suggestions for the public sector to follow that will lead individuals or groups to act in the interests of social efficiency (e.g., through subsidies and taxation for education), as well as to provide information which is relevant to judgements about the equity of alternative courses of action.

An even more fundamental criticism of the above approach to economic evaluation is its dependence on an unrealistic set of assumptions about how the economy behaves and, most particularly, its assumption that differences in power and control do not play a part in resource allocation. To the extent that the assumptions of a perfectly competitive marketplace do not hold it is not at all clear that prices serve as any sort of guide to social value. Minimizing costs or maximizing the difference between benefits and costs may offer no guide to wise social choices under these circumstances. All decisions then involve questions of equity, since "social efficiency" becomes an ambiguous concept. Different groups will favor different alternatives, depending on the costs and benefits to them, and there is no overarching criterion which can be

applied to determine what is in society's interests as a whole.

Perhaps the most well developed alternative to economic analysis based on competitive market theory is that based on the works of Karl Marx and subsequent modifications to his theories. Marxist economists focus on the struggle between groups or classes with competing interests and with substantially different degrees of power. They view our economic system in terms of the historical systemic forces which both sustain and combat the substantial economic control exercised by the current array of large, monopolistic capitalist institutions. Such power relegates many individuals to relatively alienated and impoverished existences, since decisions are based neither on social efficiency or equity grounds, but are heavily influenced by capitalist interests. Policies are analyzed in terms of the historical context within which they are derived and carried out, and usually valued to the extent they increase the power and control of the working class relative to the capitalist class.

Marxist economists view educational activities in the context of an institution which for the most part is oriented toward supporting the existing capitalist structure. Education does this by providing individuals with the requisite skills and attitudes necessary to functioning in capitalist institutions and by legitimating a form of economic authoritarianism under the guise of freedom, democracy, and meritocracy. Such economists see a primary task of schooling to be the formation of individual personality attributes and attitudes that allow him or her to function within a hierarchical authority structure motivated by rewards external to the production process itself. Education is seen to follow class lines, with students from poor families given those skills and attitudes useful for lower income and status occupations.

B. Credit by Examination

The above exposition is necessary in order to understand the economic issues surrounding the practice of awarding college credit by examination instead of coursework. The policy questions raised and how to answer them depends critically on the economics perspective taken. In this section we look first at the issues raised within the competitive market economist perspective in terms of costs, cost-effectivenss and costs relative to benefits. We then discuss those equity related issues, including financing concerns. Finally, we comment on some of the issues raised from other economic perspectives. From any economic perspective the interest is usually not directed toward the

evaluation of one isolated course of action, but the evaluation of that policy vis-a-vis alternative possible policies. The issues raised below are primarily concerned with the credit by examination alternative compared to the traditional practice of awarding credit for coursework. Nonetheless most of the questions examined are equally relevant to the comparison of CBE and traditional instruction with other potential alternative post-secondary educational policies.

Clearly an important economic question is the costs associated with credit by examination policies versus credit for coursework. Again, the focus is on the total costs to the society--we will consider the questions of the costs to different groups when we discuss equity issues below. It seems likely that the costs of the resources devoted to awarding credit by examination will be considerably less than those necessary to provide classes for students to attend. This cost difference will likely be even more substantial if, as economists argue, one includes the cost of student time, usually measured by the potential income (and thus social productivity) that is foregone while the student is in school. Nonetheless, the results of this cost comparison are not clear-cut. There are many costs that may be associated with CBE--e.g., the costs of test develoomment, local validation, test administration and evaluation, and student advising, and record-keeping. Moreover, the exam failure rate may be higher than the course failure rate and thus CBE resources may be needed for more students in order to yield the same number of accredited students.

The cost issue is really even more complex since above we were implicitly assuming that the alternatives being compared were simply means of awarding credit for any given class. However, the subsequent behavior of a student who is awarded credit by examination may be different than if she or he had to take course work. For example, a student who obtains credit by examination may not spend less time in school, but may spend the same time and just take more courses. The calculation of the cost of CBE policies vs. traditional policies must include the costs of such subsequent effects.

A cost analysis along the lines discussed above serves as partial information to examine the key economics evaluation issue--do the relative benefits of CBE outweigh its relative costs, as compared to traditional accreditation. As we said above, many economists have looked at the earnings of schooling graduates as a valid monetary measure of the social benefits of schooling, and thus one could look at the difference in employment and earnings related effects

between the two alternatives. For example, if CBE policies allow a student to graduate and obtain a job earlier, then not only are the costs lower, but the benefits are higher (e.g., one more year of earnings and production). However, such estimates are not easy to make.

It is not at all clear how education affects earnings and productivity, and even with an adequate theory, it is difficult to separate the empirical effects of all the various variables that affect earnings to arrive at the impact of particular educational experiences. It may be that the aspects of a university education that yield a higher paid and more productive worker are not the same as the cognitive knowledge that CBE tests for. In this case, the earnings and productivity of a CBE intensive graduate may be less than if the graduate had taken more coursework. Alternatively, the earnings may be the same (if firms, at least initially, respond to the college degree as an indicator of skill and thus pay for the degree), but the individual's productivity may be lower. Thus even within the approach of competitive market economics, it is not a simple matter to estimate the monetary social benefits of an individual's education.

These considerations, and the additional belief that there are many socially valued outcomes of education that can not be easily translated to a monetary metric, leads to an interest in the cost-effectiveness of CBE policies, with effectiveness measured on a number dimensions. In the simplest terms, if one major function of a university is to certify certain competencies, it will likely be more cost-effective to award some students credit by examination instead of forcing them to take subjects about which they are already knowledegable. CBE policies may thus yield a lower cost per credit obtained which may translate, if CBE intensive students spend less time obtaining a credential, to a lower cost/graduate. Again, however, the cost-effectiveness of CBE vs. credit for coursework is not easily estimated. The impact of each alternative is likely to involve more than simply a question of how course credit is awarded. For example, the following potential effects of CBE policies may be significant and need to be considered in a comprehensive cost-effectiveness analysis:

(a) CBE intensive students may not graduate earlier, but may instead take additional courses, and thus one aspect of the benefits of CBE is the value attached to the increased choice in, and learning from, college that CBE students gain. In this case, of course, one must give consideration to the additional costs of CBE policies which will probably increase enrollments

in smaller, more specialized courses while decreasing those in larger, more general courses, most likely increasing the total costs of obtaining a degree.

(b) Requiring a student to take coursework in which they already have competence may lower motivation and consequently CBE policies may yield positive effects in terms of its impact on the student's interest and success in the college courses he or she does take.

(c) Extensive use of CBE may result in more homogeneous groupings of students in many courses. This may result in either greater or lesser learning among those students, and such impacts need to be evaluated as well.

(d) CBE policies in universitites may yield changes in high school programs and the costs and benefits of such impacts must also be included.

(e) CBE policies for undergraduates may yield changes or reactions in terms of graduate school admission policies and student success in graduate school and those consequences must be studied as well.

(f) The institution of CBE policies may affect enrollments by attracting more and/or different types of students to certain universities and again the social consequences of such changes need to be evaluated.

(g) CBE policies may lead to a standardization or homogenization of college learning competencies that may be viewed as beneficial or detremental.

If the question of whether CBE policies are socially efficient seems complex, the question of its equity implications is even more so. The costs of CBE are financed by some groups and individuals, and different benefits accrue to different groups and individuals. If the world behaved as competitive market economists theorize then the problem would be simpler. If university education were a competitive, private, profit-making economic activity that only affected the students themselves, then CBE practices would be instituted to the extent that individuals thought them worthwile for the money they cost vis-a-vis other means of seeking accreditation. However, universities are subsidized by the public sector, some are managed by the public sector, and the education of one individual may affect others which all increase the complexity of the social impacts of such educational transactions.

What is a cost to one individual or group is often a benefit to another, which makes for conflicting interests in and evaluation of CBE policies. For example:

(a) a student's saving of tuition may be income foregone from a university's point of view

(b) a state's savings in terms of a lower cost for university education again may be viewed as a cost (income foregone) from the university's perspective

(c) the benefits to students of skipping courses may be a cost to their classmates who find the composition of their class less stimulating

(d) the cost to a student of taking an examination may be a benefit to the organization that makes up the tests.

Economics, as based on competitive market theory, generally views such conflicts as obstacles which may be gotten around by appropriate incentives (taxation and subsidy policies) in order that the most socially efficient alternative be chosen, i.e., that one which maximizes net social benefits (social benefits minus social costs) as opposed to private benefits to any one group or individual. In practice of course such conflicts are difficult to resolve; moreover, given the general theoretical and empirical difficulties with competitive market economics, and in particular with prices and wages as measures of social values, it is difficult at best to discover which course of action is most "socially efficient," especially since the concept itself may be somewhat shaky.

Some critics of this general approach to the economics of education argue that it is the selection and certification function of university (and other level) education that yields benefits on the job market, as opposed to what is learned. Such economists would likely argue that the existence of credit by examination practices supports their view. If it were cognitive knoweldge, not the certificate, that was being rewarded, workers would eventually get the benefits of their knowledge whether or not they obtained college credit (and a diploma) for it. Alternatively, some Marxist economists, as mentioned earlier, place heavy emphasis on the non-cognitive effects of schooling, much of which is seen as informal learning through the structure and process of schooling, and their influence on productivity and earnings within a capitalist work organization.

From this perspective CBE policies may be certifying only one type of education produced competency, and perhaps one of lesser importance, that employers are looking for. From a Marxist or other perspective critical of convetional economics it is important to evaluate a reform like CBE in its historical structural context. The general move in education toward competency based certification (of which CBE and experiential learning are a part) and the concern with university cost reduction can be seen as a reaction of capitalist interests to a growing populace pressure towards a democratization of post-secondary education.

In sum, the perspectives that various economists bring to an evaluation of CBE policies pose many questions concerning its social and private costs, effects, and benefits. I think it is a mistake to believe that any version of economics can resolve these questions and select the "optimum" course of action to follow. What economics can do best is to provide some competing frameworks from which one can observe and evaluate actual and potential educational practices. In the next section we briefly review the research that has been done relative to the CBE policy related questions discussed above. In Section IV the focus will be on what additional research seems to be needed.

III. REVIEW OF THE LITERATURE

The reports in the early seventies of the Carnegie Commission on Higher Education (1971, 1972) were both influential and a sign of the times in calling for less emphasis on traditional university credentialling, a reduction in the time necessary to obtain college degrees, and a reduction in university expenditures. The formation of such groups as the Commission on Non-Traditional Study and the Cooperative Assessment of Experimental Learning again signalled the growing attention to formal certification of competencies gained out of school (see Keeton and Associates, 1976 and Meyer, 1975 for some good general discussions of these issues).

The expansion of credit by examination interest and opportunities was presented by advocates as clearly in keeping with this general thrust (see Kreplin, 1971 for an early look at some of the issues). For example, O'Hearne (1972, p. 23) saw CBE as a way "to reward academic accomplishment and at the same time conserve resources," presenting mostly some of the possible positive affects discussed above in terms of benefits to individuals, their families,

schools, and governments, and trying to counter some of the objections raised related to academic standards and tuition losses. Despite the rapid expansion of CBE practices over the subsequent years empirical research in the area is scarce, inadequate, and from an economics perspective, almost non-existent.

Some economists have talked generally about economic analysis applied to variants from traditional post-secondary schooling practices (e.g., see Jamison and Wolfe, 1976 or Klees, 1975), but no studies particular to CBE have been undertaken by economists to my knowledge. Most of the little research existing in the area seems to be done previously by people oriented to educational administration, psychology, or psychometrics. Willingham (1974), in an interesting discussion of many of the pedogogical and placement issues relevant to CBE, concludes his book as follows:

> Though educational practices are increasingly rationalized in financial terms, exceptionally little attention has been devoted to the cost-benefit character of alternative treatment models. There has been considerable interest in possible cost savings in credit by examination, but public analyses have been mostly superficial.

This conclusion seems to be as true four years later. Some researchers, probably influenced by the growing push towards greater "economic rationality," sprinkle their evaluations with comments about "efficient" or "optimal" courses of action (e.g., see Caldwell, 1977, p. 402 or Stallings, Aleamoni, and Heil, 1973, p. 614), but such notions bear little resemblance to the economic concepts discussed previously. Nonetheless, a number of these researchers do take at least a cursory look at questions of cost, and futhermore the issues they are most concerned with are related to the questions economists would aks about effects and benefits. Below we briefly review some of this literature.

A number of studies have discussed the costs of CBE vs. the cost of coursework for credit, although none have been thorough comparisons in the social cost sense of economics. Moughamian (1976, p. 5) comments that the 50,000 credit hours awarded by examination to Illinois community college students between 1972 and 1975 would have cost the state about one million dollars if obtained through coursework, and the total costs of instruction would have been even higher. Furlong (1977, p. 31) reports the Florida Education Commissioner's similar estimate of over 8.5 million dollars saved

in total instructional costs in Florida during 1974-75 due to CBE. McCluskey (1976) and McCluskey and Richmond (1975) presents the same type of cost analysis for Arkansas State University.

One problem with such analyses is that they generally give the costs of the CBE alternative. McCluskey (1975) provides the monthly administrative costs of the CBE program to Arkansas State University but the exclusion of many costs (such as those of the tests themselves) and the format of the data presented make comparisons with normal instructional costs difficult. Stallings, Aleamoni, and Heil (1973) present a somewhat more thorough comparison for the University of Illinois' CBE system, showing a cost per credit hour of $7.09 for CBE vs. $15.18 for classroom instruction. However again many cost components are neglected, even from the university's point of view. Furlong (1977) points out the importance of additional counselling, information provision, and record keeping costs engendered by CBE that are rarely studied or accounted for.

Perhaps most importantly, all the studies above assume that the comparisons is betwen the expenditures for CBE versus those for credit through classwork in the same subject. This expenditure view of costs neglects the critical opportunity cost of stduent time, which could make CBE seem considerably more attractive. Moreover, this procedure totally ignores the fact that CBE policies affect more than whether a particular course is taken or not. As we discussed earlier, students who obtain credits by examination may take fewer courses and graduate earlier, or they may simply take other courses, possibly resulting in even greater total costs incurred than without CBE. These longer run cost implications of CBE policies have not been studied.

Caldwell (1977) meets meets some of these objections by asking Florida students how much they saved by obtaining credit through examinations (about $1800 was estimated for students getting 36 to 45 credits hours), but again total social costs are not considered and it is not clear how valid student responses are, especially since many of them did not seem to graduate any earlier. Caldwell's study probably comes closest to yielding some data that would be of interest to economists concerned with benefit evaluation, in that he looks at the impact of CBE on early graduation. He finds that about 25% of CBE intensive students graduate in three years of study compared to the same rate for non-CBE students achieving graduation in four years. Although this may yield some earlier earnings and productivity benefits for CBE intensive students, the

small proportion of early graduates diminishes the total benefit advantage that is often presumed to exist. Moreover, Caldwell felt that his attempt to select equal ability non-CBE students may have been inadequate and the only other study on this issue of which I am aware, by Enger and Whitney (1970) of University of Iowa students, showed that the earlier and higher graduation rates for CBE students were likely explained by differences in academic ability more than by the use of CBE.

As we have seen, no work has really been done on the economic benefits of CBE, although some of the non-monetary effects have been studied such as those above. Even studies of the effects of CBE are rare, however. Most of the attention has been focused more on questions of the validity of the tests, and the norms, cut-offs, and interpretations used (e.g., see Tittle, Weiner, and Phelps, 1975 and Caldwell, 1973). Sometimes gross follow-ups comparisons are made between CBE and non-CBE students in terms of the course grade they later achieve and the type of subjects they enrolled in (e.g., see McCluskey and Richmond, 1975). However there is no real analysis of these results, the lack of any controls make them suspect, and they are probably not the most important foci for effectiveness studies. There is some discussion in the literature of how CBE policies affect college and class enrollments (e.g., see Kimmel, 1976 and Moughamian, 1976), but these are generally speculative without any empirical studies to examine such impacts.

Given the paucity of information available about CBE relative to traditional economics conceptions of costs, effects, and benefits, it should not be surprising that little attention is focussed on equity related issues. For example, no study looks at the different impacts of CBE on students from low and high SES families. Some equity questions are indirectly raised by discussions of the different benefits and costs of CBE that accrue to different stakeholder groups. However, this is rarely focussed on as an issue involving social equity, but usually is discussed from an advocacy perspective attempting to support or criticize CBE policies (e.g., most advocates are especially concerned with countering the cost-to-them objection, posed by colleges interested in surviving in a period of declining enrollments. against instituting a CBE policy which could cut enrollments).

Given that no conventional economists have evaluated CBE policies, it is again not surprising that no Marxist economists have. However, at least two observers make some comments about CBE that can be viewed within such a framework. Apstein (1975) discusses some of the "dangers" of CBE in terms of the likelihood that testing, especially the common use of multiple choice examinations, will miss the more important aspects of what is learned in the college classroom. From Apstein's viewpoint college can and should be a non-passive experience in which ideas and concepts are tested and challenged, while heavy reliance on CBE "develops a docile, uncritical reliance on the opinions of experts" (p. 358). Other observers have raised related questions relative to the structure the generates these tests (e.g., see Stecher, 1977 and Rein, 1974).

Yamamoto (1975) commenting on Apstein's article, raises even more basic questions, both about the importance of CBE as an issue, as well as the means of judging its efficacy. For the most part he dismisses the importance of the CBE issue since he believes our main concern should be to examine the growing certification fever in our society and its implications for the question, "does schooling have anything to do with education?" His view of conventional economist/management appraoches to the evaluation of such issues is impicit in his summarization of such a viewpoint:

> The process of schooing is regulated by a closed input-treatment-output feedback loop, and the manufacturing operation is judged for its efficacy in manpower, space, time, and ultimately, cost. Uncertainty, unpredictability, and uncontrollability are the anathema to the whole system. notwithstanding the fact that these qualities are characteristically human. (p. 361)

IV. FUTURE RESEARCH

From the above review is should be apparent that existing research has not even scratched the surface in examining what are the cost, effectiveness, benefit, equity, or structural impacts of CBE policies. The scarcity of related publications in professional journals and of even unpublished research is indicative of the lack of attention this issue has received. To develop adequate empirical investigations of CBE issues means generating interest among researchers and sufficient funding to follow through, both of which clearly go hand in hand.

To yield what social science generally regards as a high quality empirical investigation relative to CBE policy related questions is an expensive endeavor, and may not have a high probability of coming up with reliable information on which to base policies. For example, economists of similar perspective, with

considerable research funds, often come up with very different estimates of the costs, benefits, and rates of return to additional time spent in schooling, and have hardly been able to deal with the question of what it is about this time in school that yields private and social benefits. Economists (and all other research) studies of the effects of schooling inputs on outputs have yielded even less consistent results. All the problems faced in such research activities will be faced in CBE investigations, since the same theoretical and empirical considerations apply. Whether the investment in such research is worthwile is not clear from the standpoint of yielding better decision-making. Nonetheless, most researchers would probably argue that the information generated from good research would likely be an improvement on the guesswork that must go into present CBE policy-making since hardly any impact evidence is available.

Several components are necessary to an adequate research effort capable of yielding generalizable information from a conventional economics perspective of the costs, effects, and benefits relevant to CBE decision-making. First, at least a regional or national sample of students and institutions need to be studied, as opposed to the few partial case studies that presently exist. Second a relatively long-term longitudinal framework is necessary, probably at least 4 to 6 years, in order to capture the potentially important cost, effect, and benefit impacts discussed in Section II.B. Third, it is likely that an interdisciplinary research effort would be required to deal with the myriad of pedagogical and strctural effects that CBE policies likely generate.

Again, it should be clear that such reserach will be expensive and I have already commented on the problems of the reliability of the results. Relevant to this latter issue and the likelihood that conflicting theories and conflicting interest groups would probably generate very differnt research results, it is probably important that several research efforts from different conceptual and practical perspectives on CBE issues be supported, if any is to be undertaken at all. Such is not commonly done, but seems the only means of achieving some balance to the information and argumentation put forth as a basis for policy decisions. This type of competing research effort approach does not have to be substantially more expensive than 'one perspective research. A funding agency could require a few competing groups to cooperatively decide on what information is to be collected, and then to undertake separate analysis

and evaluation of the data collected, an approach that has been used successfully a number of times to my knowledge.

It is difficult to be any more specific about future research in this area. There are many, many different studies that could be designed at widely different costs to examine some particular aspect of CBE impact. To examine what I consider the major impact questions (discussed in Section II.B) in a comprehensive fashion would take a long term effort and a minimum of several hundred thousand dollars, depending on which specific questions were the primary focus and how much emphasis was given to including different disciplinary, theoretical and stakeholder perspectives. In conclusion, I would be happy to discuss any of these issues with you if you wish.

REFERENCES

Apstein, B. Dangers of credit by examination. The Educational Forum, 1975 (March), 39, 3, 354-8.

Caldwell, E. In-college effects of acceleration by examination. Journal of College Student Personnel, 1977 (September), 399-402.

Caldwell, E. Analysis of an innovation (CLEP) The Journal of Higher Education, 1973 (December), 44, 9, 698-702.

Carnegie Commission on Higher Education. The more effective use of resources: An imperative for higher education. Hightstown, N.J.: McGraw-Hill, 1972.

Carnegie Commission on Higher Education. Less time, more options: Education beyond the high school. Highststown, N.J.: McGraw-Hill, 1971.

Enger, J.M., and Whitney, D.R. CLEP credit and graduation: A four year study of the University of Iowa. College and University, 1974 (Spring), 49, 3, 236-241.

Furlong, T.E. The perceptions of selected groups of university and community college administrators of the CLEP and its implications for the state universities and community colleges of Florida. Unpublished doctoral dissertation, The Florida State University, 1977.

Jamison, D.T., and Wolfe, B.B. Assessment and accreditation economic considerations. In Willingham, W. and Nesbitt, E. (Eds.) Implementing a program for assessing experimental learning. Princeton, N.H.: CAEL, Educational Testing Service, 1976.

Keeton, M.T. and Associates (Eds.) Experimental learning. San Francisco: Jossey-Bass Publishers, 1976.

Kimmel, E.W. Financing credit by examination: A framework for discussion. Unpublished paper, Educational Testing Service, Princeton, N.H., 1976.

Klees, S. Post-secondary open learning systems: Cost, effectivenss, and benefit considerations. In Designing Diversity '75: Conference proceedings. Lincoln, Nebraska: University of Mid-America, 1975.

Kreplin, H. Credit by examination: A review and analysis of the literature. Berkeley, Ca.: University of California, 1971.

McCluskey, J. Financing credit by examination, issues and implications. Unpublished paper, Arkansas State University, 1975.

McCluskey, J. and Richmond, M.J. Summary report on Arkansas State University's participation in the CLEP, 1971-1975. Unpublished paper, Arkansas State University, 1975.

Meyer, P. Awarding college credit for non-college learning. San Francisco: Jossey-Bass Publishers, 1975.

Moughamian, H. Financing credit by examination: Issues and implications. Unpublished paper, City Colleges of Chicago, 1976.

O'Hearne, J.J. New college scholarships - rewards in the coin of the realm. College Board Review, 1972 (Spring), 83, 22-4.

Stallings, W.M. Aleamoni, L.M. and Heil, D.K. The University of Illinois placement and proficiency system: Description and results. Journal of Higher Education, 1973, 610-19.

Tittle, C.K. Weiner, M., and Phelps, F.D. Validity of awarding college credit by examination in mathematics and english. Educational and Psychological Measurement, 1975, 35, 455-459.

Willingham, W.W. College placement and exemption. New York: College Entrance Examination Board, 1974.

Yamamoto, K. Some comments on "dangers of credit by examination." The Educational Forum, 1975 (March), 39, 3, 355-61.

Rein, R.K. Educational Testing Service. The examiner examined. Changed, 6, 3, 40-46.

Stecher, C. CLEP and the great credit giveway. Change, 1977 (March), 9, 3, 36-43.

The Economic Impact of Credit by Examination Policies and Practices: Identification of Issues and Implications for Research

Prepared for the
Educational Testing Service
Princeton, New Jersey

Alan P. Wagner
Purdue University

December, 1977

Although the figures are imprecise, perhaps as many as one million individuals annually complete examinations that provide some form of postsecondary academic credit. The credit may permit placement beyond introductory courses (e.g., the Advanced Placement Program or departmental "challenge" exams). Acceptable performance on the exams may bring actual credit hours toward graduation (e.g., the College-Level Examination Program) or, in some cases, directly afford the student the baccalaureate degree (e.g., the Regents External Degree Program). As an alternate means of assessing individual skills, these examinations can greatly influence the decisions of individuals, institutions, and governmental jurisdictions. An understanding of how credit by exam might influence these decisions can usefully lead to the assessment of potential and actual benefits and costs from the programs.

The purpose of this report is to identify the potential economic impacts of credit by examination and to suggest further research which might better illuminate these effects. Sections I through III below include an evaluation of the potential impacts of credit by examination on individuals, institutions, and states, in turn. Each section begins with the development of a general framework appropriate for examining the possible effects. The discussion draws upon the findings of previous research in the area, where available.

No attempt is made to evaluate the quality or content of the exams: in short, the tests are assumed to measure what they are designed to measure. To the extent, however, that certain subject areas are not

amenable to standardized testing or faculty in certain areas or departments are reluctant to adopt the exams, these differences are incorporated as institutional costs (and potential disincentives to students). Throughout, "credit by examination" is intended to be an all-inclusive term. Where the discussion focuses on the time-shortening of degree programs, the reader should recognize that only some of the exams (e.g., CLEP but not generally AP) afford this option.

In section IV, I attempt to place the credit by examination option in the context of the future demand for and supply of places in higher education. I argue that the combined pressures of declining enrollments of traditional students and the increasing desire of students and their families to minimize the private costs of investment in postsecondary education might well overcome the reluctance of faculties and institutions to adopt and emphasize time shortening, credit by examination alternatives.

The report concludes with suggestions for four complementary research initiatives. The estimated budgets provided there refer only to direct research costs. Secretarial, supplies, and overhead costs are not included. If undertaken, these studies should provide results which can more specifically pinpoint the nature and extent of the economic costs and benefits from credit by examination.

I. The Economics of Credit by Examination for the Individual Student

The initial decision to enroll in postsecondary education can be viewed as a household <u>investment</u> decision. By this, we mean that the student devotes <u>current</u> money and time resources to the educational activity in anticipation of realizing greater <u>future</u> income and non-money

returns.[1] The investment framework usefully distinguishes between the private benefits and costs of college attendance. More than just a classification, this distinction immediately reveals that the more important potential effects of credit by examination may result from a reduction in the time needed to complete a degree program. Specifically, if the baccalaureate is received in less than four years, the investment costs are lower and returns from the investment begin sooner.

More technically, the relationship between the returns from and costs of household investments are commonly summarized by a rate of return calculation (see, for example, Becker 1975, Psacharapoulos 1973, and Freeman 1976). This summary measure of the profitability of or payoff on an investment has been used in two ways. First rates of return among alternative household investments, including higher education, can be compared (see Dunkelberg and Stephenson, n.d., for comparisons of rates of return among household durables). Second, we can observe and estimate the effects of changes in the returns from or costs of investment (through, for example, credit by examination options) on the profitability of the investment to the individual, i.e., the rate of return.

In this context, the impact of credit by examination on the economic payoff to individual students can be examined. Table 1 summarizes the discussion which follows.

Investment Costs

The "new" consumer economics views matriculation as a household

Potential Economic Impact of Credit by Examination for Students

Student Decision (those with credit)	Costs	Returns
Same Academic Program, Advanced Graduation	- Reduced expenditure and time costs + Examination and recording fees - Greater adjustment problems	+ Earlier earnings returns, over a longer period - Fewer in-school consumption returns - Uncertainty about validity of examinations - Ease of substitution for regular credit when transferring
Different Academic Program	- Reduced expenditure and time costs (if date of graduation advanced) + Examination and recording fees + Greater adjustment problems	+ Earlier earnings returns, over a longer period (if date of graduation advanced) - Fewer in-school consumption returns (if date of graduation advanced) - Uncertainty about validity of examinations - Ease of substitution for regular credit when transferring Advanced, Broader Program + Augmented skills rewarded with larger earnings + Augmented skills contribute to non-market productivity Induced Field of Study + or - Fields with credit by exam option have larger (smaller) earnings opportunities

production activity in which the student combines purchased goods (instruction, books and supplies) with study time to "produce" or acquire additional mental skills or knowledge. Unfortunately, our knowledge about the contributions of instruction, student time, and other "environmental" factors to the acquisition of skills is still at best imperfectly understood. More serious is our inability to determine whether these added skills, if produced, are rewarded by employers (the so-called "screening hypothesis," about which more will be said below).

In the short run, time and financial constraints impose added costs for the enrollment. First many institutions require one year's work for one academic year of credit. Where students who already possess college-level skills are still required to complete four years of study for the baccalaureate, additional resource and time costs are imposed. Clearly, all time-shortened degree programs, such as those afforded by CLEP, reduce the rigidity -- and costs -- of the residence requirement. Second, students might incur "financing" costs if they are required to use external sources of funds (e.g., commercial loan, student loan, part-time work) to meet educational expenses. Since the cheaper private resources in family savings and other liquid assets tend to be limited, the "financing" constraint probably becomes more severe the longer the student remains in school.

For our purposes, these latter "added" costs can be incorporated into the accounting of the principal costs of investment in higher education.

Direct expenditures. Perhaps the easiest to visualize, direct expenditures consist of the cash outlays for tuition and fees, books, and supplies. Incidental transportation costs can be included as well. The fees for credit by examination tests, plus recording fees, would normally fall into this box. Generally, credit obtained through examination is considerably cheaper to the student than credit through instruction. The CLEP test fee of $40 for a potential 3 or 6 credit hours works out to be much lower than most public sector charges ($30 per credit hour), except in the no-tuition community colleges of California.

If students had been required to enroll in and to pay tuition and fees for the courses for which they received credit, the nationwide gross "savings" to the students have been estimated to total at least $6 million (adapted from Darnes 1976).[2] Similar calculations suggest tuition "savings" of $444.05 per successful candidate at one public university (McCluskey and Richmond, n.d.) and $85-$100 per successful candidate in one state where CLEP is widely used (Furlong 1977). Unfortunately, these figures are grossly misleading. The estimates require the implicit assumptions that either (a) the student enrolled for fewer total hours and hence realized direct savings, or (b) the student would have enrolled in the exempted courses and completed all the courses in his "after credit" program had credit by exam not been awarded. The evidence suggests that neither assumption is true. First, among full-time students, tuition and fee charges tend to be the same from a 12 credit hour load on up. A student receiving six credit hours

through examination could have registered for twelve hours instead of eighteen, and incur the same tuition and fee charges.[3] Second, most of the studies to date seem to indicate that a relatively small share of students using credit through examination actually shorten their time on campus (see next section). Third, the studies of similar students, with and without credit by exam, indicates that those with credit tend to take more advanced courses than those who do not (Caldwell 1977, Kreplin 1971).

Earnings foregone. If student time must be used to acquire a degree, the value of the time spent away from the market place must be included in the costs of investment. T.W. Schultz (1971) has persuasively argued that earnings foregone constitute the larger share of private monetary investment costs, perhaps as much as 75 percent. Most other estimates, although imperfect, are within the 60 to 80 percent range (see Becker 1975, Crary and Leslie 1977). Any program or policy which can reduce the time spent in school can greatly lower the costs (both in earnings foregone and direct expenditures) and so enhance the profitability of the investment.

The evidence on the time-shortening effect of credit by examination is sketchy. Overall, the available data indicate that the majority of students receiving credit through examination do not graduate earlier. First, in very few instances do successful CLEP candidates average more than 8 to 10 hours of awarded credit through examination. For example, the Florida candidates in the university system received on average 16 credit hours, while those in the junior college system

received an average of 8 hours of credit (adapted from Furlong 1977). At Arkansas State University, about one-half of the test-takers receiving credit were awarded 9 hours or less (McCluskey and Richmond n.d.). Stallings, et. al., report that those successfully taking exams for credit at the University of Illinois do graduate somewhat earlier, but the difference is not very great (1972). Enger and Whitney (1974) provide data which indicate students with CLEP credit graduated earlier than those without examination credit, but subsequent regression analyses seem to suggest most of the difference in accleration is explained by differences in college grades, the ACT score, and high school rank. Since these variables, and CLEP credit hours, tend to be highly collinear, the statistical results need to be viewed with some skepticism. In Caldwell's study of University of South Florida CLEP candidates awarded credit on at least 4 out of 5 exams (only 10 percent of those receiving credit), less than half (46 percent) estimated they had saved one year of schooling (1977). However, a second comparison indicated that the students with large amounts of CLEP credit graduated in $3\frac{1}{4}$ years at the same rate as similarly able students without CLEP credit did in $4\frac{1}{4}$ years. The latter finding does suggest that at least those with about a year's worth of CLEP credit do tend to graduate a year earlier.

Benefits

Generally, the returns from investment in postsecondary education take two forms. First, more highly trained individuals tend to earn more and to incur fewer and shorter periods of unemployment -- a direct

monetary payoff (Blaug 1970; Psacharopoulos 1973). Second, individuals with greater levels of education appear to be more efficient consumers and to possess better child-rearing skills (Michael 1972; Leibowitz 1975). Both money and non-money returns accrue directly to the student. There may be additional current satisfactions ("agreeable experiences" in Bowen's terminology) realized by the student while in school.

The effect of credit by examination on these potential returns to the student and family depends upon how students respond and upon the assumptions about how schooling affects later market and non-market returns. Two patterns are described below.

In the most basic case, students simply elect to advance the date of their graduation, completing the academic program they would have taken without the awarded credit through examination. In the more complex and realistic scenerio, students alter their academic program. They may or may not advance the date of graduation. The potential returns from a more rigorous or broader academic program or a newly-chosen field of study may be greater or smaller than the student and family would have realized without credit by examination.

1) If credit by examination does not alter the academic content of a student's degree program -- that is, if the credit merely <u>replaces</u> or <u>substitutes</u> for introductory courses the student would otherwise have taken -- then the student leaving school earlier realizes the benefit of earlier earnings returns on the investment. Since returns 30 or 40 years in the future are highly discounted, the longer earnings period resulting from early graduation will have a positive but relatively

modest impact.[4] Since, by assumption, the student graduates early, he loses some of the current consumption returns from attendance as well.

Two further considerations affect the potential returns to credit by examination. First, individual students might view the examination option as a risky alternative. That is, even if successful on the exams, some may believe they will not do as well in subsequent courses and so be less likely to graduate ahead of schedule. This perception can be accommodated by discounting future benefits for the perceived level of risk. Very little of the accumulated data relate to student attitudes toward the option. Caldwell's 1977 study suggests that few academic problems actually arise. Since candidates for credit by examination come from the highest ability groups, this finding should not be surprising.

A related dimension of the impact of credit by examination on benefits is the ease with which these credits can be transferred among institutions. If examination credits are not as easily transferred as regular, instructional credits, the student may be constrained in the options afforded through credit by exam. Potentially greater learning opportunities at other institutions may be precluded because the exam credits will not be honored. Assuming the greater accumulated knowledge would bring added returns in the work place and in non-market activities, potential benefits from the investment might well be reduced.

The evidence on the substitution of different types of credit is very limited. Moughamian argues (without evidence) that exam credit more easily transfers than regular course credit (1976). On the other

hand, Caldwell suggests the greater retention of CLEP students at South Florida implies that fewer do transfer (1977).

2) If the credit by examination option induces the student to alter the academic content of the degree program, the impact on potential returns is less clear.

Unarguably, if the student still graduates early, the earlier receipt of earnings, and its continuation over a longer time period, generally increases returns, for the reasons just discussed.

The effects of the rigor of the chosen academic program on benefits, however, are unclear. Successful credit by exam candidates apparently do take more advanced courses. At Utah, for example, increasing use of CLEP attended the reduction in freshmen English sections and an increase in literature sections (Furlong 1977). The very successful CLEP students studied by Caldwell enrolled in advanced courses at the same rate as their similarly able peers (1977). Using an ETS-College Board survey of institutions receiving CLEP scores, Grandy and Shea (1976) report that at over half the institutions, a majority of those receiving CLEP credit took advanced courses in the same area (except for social sciences and history).

These results, however, do not speak to the question of potential future benefits. If the advanced courses truly augment market skills and if employers reward these greater skills with higher salaries, then the student has realized added benefits made possible through CLEP. Similarly, if the advanced courses enhance the future non-market productivity of the student, then the student will obtain greater benefits

from the investment in postsecondary education than he otherwise would have received. The issue of whether, and to what extent, schooling contributes to learning and acquired knowledge to later earnings and non-market returns remain the subjects of considerable study. (See, for example, Jencks 1972, Summers and Wolfe 1977, Solmon and Taubman 1973)

Further, if the student -- through the inducement of early graduation -- has selected an area of study where the earnings are lower than his non-CLEP choice, the gain of earlier earnings might be more than balanced out. The situation described is analagous to what has occurred with public financial subsidies for students. As an example, the National Direct Student loan program at one point included liberal provisions that permitted the loan to be cancelled if the student became a school teacher. No other chosen occupations qualified the borrower for full loan cancellation. The many state teachers' colleges, with subsidized tuitions, also afforded incentives for students to train for teaching. Thus, even though salaries for teachers were low (and continue to be low), the incentives on the cost side encouraged enrollment at the margin in teaching fields. As O'Hearne (1972) has suggested, credit by examination is a form of aid to the student. We just don't know the effects this type of aid has on college or field of study choices.

II. The Economics of Credit by Examination, for Postsecondary Institutions

The use and design of credit by examination programs at individual institutions are conditioned by the likely impacts on institutional goals and costs. Briefly, postsecondary institutions can be viewed as

attempting to achieve conflicting or overlapping goals. Among these goals are: developing a supply of trained manpower, contributing to the creation of new knowledge through basic research, and providing public service through extension programs. Budgetary and other constraints limit institutional efforts to achieve these broad objectives. (See Wagner and Rice 1977, especially Chapter 3, for a more complete development of this conceptual framework.)

Credit by examination programs can operate either to directly enhance the attainment of institutional goals or to ease budgetary limitations. While the data here are quite limited, the review of potential impacts presented below suggests the overall economies or costs for the institution are likely to be modest. If programs need to be reduced or resources reallocated, short run costs of adjustment and possible loss of scale economies account for the major financial loss. If students do not advance graduation, additional faculty resources will be required to teach a larger number of advanced courses. These potential impacts are summarized in Table 2.

Institutional Objectives/Goals

Subject to financial solvency, most postsecondary institutions exercise considerable discretion in establishing and attaining non-profit goals. Within the broad mission of teaching, for example, institutions can attempt to attract and enroll greater numbers of applicants from the groups of students which contribute the most toward enhancing institutional prestige (the most able) or toward meeting equal educational opportunity objectives (the disadvantaged). Significantly,

Table 2

Potential Economic Impact of Credit by Examination for Postsecondary Institutions

Goals/Objectives

+ attracting most able students
+ enrolling non-traditional students
+ improving quality of instruction (through smaller class size)
+ encouraging faculty research through freed up time

Costs/Constraints

Instructional Budget

- fewer classes taught (if students graduate earlier)
+ more advanced courses taught
+ reduced revenue (if students graduate earlier)
- new enrollments
- improved retention
+ reallocation within, among fields of study

Program Budget

Non-instructional Budget

- student aid budget (if students graduate earlier)
+ counseling budget
+ research budget

such goals merit the allocation of resources toward their attainment quite apart from any effect on the difference between total revenues and total costs.

Since credit by examination programs can potentially induce students to enroll at a particular institution or in a particular field of study, these programs would directly contribute to the attainment of institutional objectives. O'Hearne (1972) has argued that credit by examination represents financial aid in the form of a potentially time-shortened degree (hence, "rewards in the coin of the realm"). Institutions attempting to attract the most able students, and thereby enhance institutional prestige, would use credit by examination as an inducement. Public two-year or urban colleges might embrace the program as a means of attracting non-traditional, older students.

Credit by examination may directly serve two other institutional objectives. First, instructional quality could be improved if successful candidates moved directly on to more advanced courses. Holding the level of faculty resources fixed, smaller class sizes would result (presumably at introductory as well as advanced levels). Alternatively, if the successful candidates completed time-shortened degree programs, the fewer class hours could be spread over existing staff, freeing up time for faculty research activities. In fact, credit by examination has apparently brought about some adjustments in faculty size (see next section), so the net contribution to these latter institutional goals remains unclear.

Institutional Costs/Constraints

The most obvious effects of credit by examination appear on the institutional balance sheet. The magnitude of these effects, plus or minus, hinge in part on student response to the programs and the costs of adjustment at the institution. The discussion which follows considers the potential impact of credit by examination on the instructional budget, the direct costs of offering credit by examination options, and potential indirect effects on other non-instructional budget line items.

A. Instructional Budget

The economic case for institutional use of credit by examination can be stated at its simplest as follows: if students test out of introductory classes and go on to receive a degree ahead of schedule, then fewer sections need be taught and instructional costs will be reduced. For example, Arkansas State University eliminated 11 sections of English Composition I from 1969-70 to 1975-76, while freshman enrollment increased by 20 percent (McCluskey, n.d.). Over that approximate period, 60 percent of the 2403 ASU students who took the CLEP English exam received at least 3 hours credit. Furlong reports a cancellation of 41 sections of freshman English at Miami-Dade Community College in the fall of 1972, allegedly attributable to increased CLEP credit (1977). The Carnegie Commission estimated that a straight forward three year baccalaureate degree program could result in 10 to 15 percent fewer undergraduates and a similar reduction in expenditures (1972). Savings in instructional costs from credit by examination programs, because of

their more limited eligibility, would hardly approach the Carnegie total.

These estimates, however, do not accurately capture the effects of credit by examination programs on the institutional budget. Five associated effects may reduce or further increase the savings just described.

First, as discussed earlier, the evidence on the time-shortening effects of credit by examination is not persuasive: many who do accelerate elect to remain for the entire four-year period, engaging in a more rigorous and broader academic program. At Utah, the savings from fewer freshman English sections were apparently offset by the costs of additional sections in literature (Furlong 1977). Yet, a widespread adjustment of course offerings does not appear to have resulted. Even in Florida, one of the more active CLEP states, 70 percent of public sector administrators indicated no major course changes (eliminations or advanced offerings) as a result of CLEP (Furlong 1977). Of course, this pattern could change should CLEP usage increase.

Second, accepting that some students do graduate early and thus somewhat reduce the instructional requirements, a comparable reduction in institutional revenues will result. Students who graduate early do not continue to pay tuition and fee charges (or bring in public subsidies, in many jurisdictions). The Florida public sector administrators are very aware of this potential impact. Furlong reports that 70 percent favor some change in public funding because of potentially

reduced revenues (1977).

Third, to the extent that individuals who otherwise might not have enrolled are encouraged to do so with credit by examination options, the instructional budget constraint might well be eased. For this to be true, the institution would have to realize additional economies of scale or assess fees which exceed costs at the margin.[5] Although many assert that credit by exam programs have encouraged enrollments, the evidence is very tenuous. On the one hand, sixty percent of the students choosing the three-year program at the Brockport campus of SUNY would apparently have enrolled elsewhere if the option were not available (Radloff 1977). However, Furlong's survey of public school administrators in Florida revealed a relatively small share (30 to 40 percent) who believed credit by examination brought in new students (1977). A survey of state policy makers also revealed some skepticism about the use of programs affording time-shortened degrees (Smart and Evans 1977). CLEP data continue to show only 55 to 60 percent of the test-takers are above age 18 (Shea 1977). Coupled with the restrictive practices imposed by many institutions and the fact that over 75 percent of those receiving credit are enrolled full time (Shea and Gandy 1977), these data seem to suggest more widespread use by individuals who might have enrolled without the credit by examination option. As these programs become more widely accepted and used, however, this pattern could change.

Fourth, improved retention would ease instructional budget constraints in much the same way as new enrollments. In effect, reduced

attrition translates into larger enrollments and reduced average cost and/or increased revenue.[6]

The evidence on this point appears to be much more solid. Kreplin's 1971 review of studies indicated broad agreement on lower attrition rates resulting from credit by examination placement. Subsequent studies, summarized in Furlong (1977), report similar results. In an attempt to compare students with a year of CLEP credit to similarly able, non-CLEP students, Caldwell shows a markedly better retention/ graduation rate for the CLEP group (1977). He cautions that the difference may be overstated because he could not track those who transferred.

Finally, if large numbers of students enroll in different courses or different fields in response to the credit by examination option, two levels of reallocation of resources may be required. Both could involve greater costs. First, as suggested earlier, the increased demand for advanced courses will require more intensive use (smaller class sizes) of more expensive, tenured faculty. Second, if students are induced to enroll in different fields of study because of the alternatives afforded through credit by examination, resources will need to be shifted from areas/ departments losing students to area/ departments gaining students. Since many of these allocation decisions are heavily influenced by the academic departments, these adjustments may be costly. The effect is quite similar to the overall decline in enrollments at the institution or system level (see Boulding 1975, for a discussion of the problem). In this case, however, faculty

concerns about the suitability of or support for credit by examination options in certain areas will offer a new set of incentives to prospective students deciding in what field of study and where to enroll. The costs of overcoming faculty reluctance to the examination option or to the reallocation of resources when no suitable standardized test can be developed must be considered as an additional expense in the short run.

B. Program Budget

A program of credit by examination imposes direct costs upon the postsecondary institution. Test development and validation can be very expensive. But, even using CLEP, AP, or other standardized tests, the grading, periodic norming and evaluation studies, test administration, and transcript recording expenses are not insignificant costs. Jamison and Wolfe (1976) describe the economic context in which these institutional costs of a credit by examination program can be evaluated. Their discussion usefully draws attention to the links between alternate procedures (regular instruction, credit by examination) and similar outputs. In so doing, they highlight the potential economies resulting from credit by examination options. In effect, their framework would lead one to accept credit by examination <u>if</u> the cost (per credit hour?) is cheaper than regular instruction. Quite apart from these comparisons, the earlier discussion suggested other potential associated institutional costs and benefits from credit by examination that would need to be considered.

Stallings, et. al. (1972) estimate the institutional costs of

providing credit by examination for the University of Illinois at $63,000 ($7.09 per credit hour) in 1970-71. Significantly, the authors report the instructional cost per credit hour measured more than $15. Therefore, assessment by examination apparently costs less than assessment through regular instruction. Sharon (1976) estimates the cost of assessment in experiential programs at $200-$300 per student, but these programs, still in development, are likely to be more expensive than academic assessment. At Arkansas State University, where the students pay a fee for taking the exam, annual costs for the test center total less than $5,000, most of which is reimbursed by ETS (McCluskey n.d.). This cost figure does not include the expenses for faculty validation and norming of the test instrument (accounting for more than half of the annual expenses in the University of Illinois program). Other earlier studies reviewed by Kreplin (1971) also excluded the costs of faculty time in test development and norming.

It seems clear, however, that some faculty involvement in the exams must be required. Therefore, costs to the institution would, at a minimum, include outlays for administration, faculty review, facilities, and record-keeping. Some part of these costs can be recovered through student fees and ETS compensation.

C. Non-instructional Budgets

Credit by examination potentially impacts on line items other than instructional activities. First, as O'Hearne (1972) has suggested, if students graduate ahead of schedule, the demands on student aid will potentially be reduced. Of course, newly induced enrollments of

able, but needy, students with CLEP credit might require additional student aid resources. Since those with higher test scores are more likely to be from higher income families, however, credit through examination might partly replace the modest "merit" awards currently made to these students.

Second, students who accelerate or upgrade their program of study may require more careful, individualized counseling (see Trivett 1975, Stark 1973). About 30 percent of the highly successful CLEP candidates in Caldwell's study agreed that there were harmful effects from CLEP. Curiously, few of the students indicated that they had suffered from any academic or social problems resulting from CLEP advancement. Over half of the public sector administrators in Florida believed that increased use of CLEP required additional resources for counseling (Furlong 1977).

Finally, fewer introductory sections would potentially limit the teaching (and part-time earnings) opportunities for graduate students. At some institutions, this may increase the cost of research.

III. The Economics of Credit by Examination for States

The impact of credit by examination on states can be directly summarized through cost-benefit analysis. The outputs of the education activity are presumed to contribute to the desirable allocation and distribution goals within the jurisdiction.[7] The measured returns are attained at a cost of tax resources plus additional opportunity costs not included in the expenditures. Those projects whose outcomes are highly valued (in dollars and dollar-equivalent social non-money

benefits) relative to the costs (a high benefit-cost ratio) would, under quite general assumptions, be undertaken.

Returns

Citizens within a given jurisdiction might favor credit by examination programs, and so allocate public subsidies for them, if the programs generated monetary and non-money outputs associated with accepted public goals. To the extent that credit by examination induced greater enrollments, increasing the returns from a more highly educated populace subsidies might be forthcoming.

But, beyond these general returns, two specific adjustments should be noted. First, if credit by examination induced individuals with certain "preferred" attributes (on equity grounds) to enroll in post-secondary education, then additional resources should be forthcoming. Evidence about induced enrollments among, say, adult or low income groups to examine either of these hypotheses is just not currently available.

Second, unlike highways or dams, the primary output of the higher education system -- trained manpower -- can leave the state. Hence, the potential returns just described would have to be reduced if a state tended to export its college graduates. Other things equal, states which retain their graduates might be expected to support credit by examination options <u>if</u> they encouraged enrollments <u>and</u> marginal benefits to the jurisdiction exceeded marginal costs.

Costs

On the other side of the benefit-cost equation, credit by exam-

ination might be expected to offer a significant impact. At its simplest, if successful candidates enroll for fewer hours as a result of receiving awarded credits, then subsidies to institutions might be reduced. This result "improves" the benefit-cost ratio for the education activity, and has been widely cited as an argument for encouraging credit by examination. For example, over five years the state of Illinois "saved" an estimated $1 million in subsidies to community colleges. In Florida, the "savings" measured $6 million in 1974-75 alone (Furlong 1977). Estimates for individual institutions suggest substantial "savings" as well (Stallings, et. al. 1972, McCluskey, n.d.).

These estimates, however, tend to mislead because they implicitly assume time-shortened degrees. Since the successful CLEP candidates apparently elect to remain on campus for almost the entire term, FTE enrollments and state subsidies would not be greatly affected. Indeed, in a recent survey barely 40 percent of state policymakers anticipated reduced student aid outlays with increased use of time-shortened degree programs (Smart and Evans 1977).

For similar reasons, credit by examination is presumed to reduce the need for new facilities construction. The Carnegie Commission estimated that one-third of the capital costs in the 1970's could have been eliminated with the adoption of a straightforward three-year baccalaureate (1972). In Florida, public sector college administrators seem to concur with the apparent reduced need (Furlong 1977). Again, unless students elect to time-shorten their degree programs, no capital cost savings would emerge. Moreover, except in those states exper-

iencing population and/or enrollment growth, the demand for capital expenditures in the near term should be minimal.[8] The more common problem may well be underuse of facilities.

The states might incur two additional costs with increased credit by examination use. If statewide validation or norming of the exams must be undertaken, these direct program costs will impose a drain on the state treasury. More significant, however, are possible costs of under- or unemployment of released faculty. These costs could offset any of the savings resulting from reduced state subsidies.

IV. Prospects for Credit by Examination

A. Context and Agenda for Research

Depending upon where one sits, the potential benefits from and costs of credit by examination balance good, indifferent, or bad. The potentials differ according to the actual responses of students to credit by examination opportunities and to the supply of these options forthcoming from higher education.

Two possible scenerios illustrate the point. On the one hand, <u>if</u> students elect to shorten their degree programs with credit by examination, the <u>students</u> potentially receive greater income returns while incurring lower investment costs. <u>States</u> might realize savings in institutional and student subsidies, holding total enrollment at the same level. <u>Institutions</u> would experience some compensated contraction -- a reduction of revenues <u>and</u> costs, and released or new faculty would suffer under restricted employment opportunities. On the other hand, <u>if</u> students elected to complete more rigorous and/or

broader programs with credit by examination, they may receive greater future income returns. States would experience very little change in the level of higher education subsidies. Institutions may face increasing costs (from relatively more advanced courses), and faculty would at least be no worse off.

Both of these cases assume expanded credit by examination opportunities will be available. Nelson (1974) has argued that the natural intransigence of faculty to innovation plus an era of stable enrollment and funding mitigates against expansion. In a recent Carnegie Quarterly, Barbara Radloff echoes these points, but also suggests that the debate about credit by examination in the early 1970's stimulated changes in academic programs which reduced the need for time-shortened programs (1977).

In a broader context, however, the pressures for expanded credit by examination opportunities are likely to become considerable. These pressures emerge from a certain decline in the size of the traditional, college-aged cohort beginning at the end of this decade, the alleged declining return to a college education, and efforts by families and students, already apparent, to economize on the costs of investment in higher education.[9]

There remains no doubt that the number of high school graduates will fall in the 1980's as the post-war cohorts continue to age. As institutions face the prospect of a smaller traditional pool of potential students, the groups of young adults who have not completed college will represent an increasing reservoir of potential enrollees. Further,

as new technology and consumer demands increase the need for newer skills while rendering even college-level skills obsolete, the demands for retraining older workers will persist and grow. These are new clientele, who must be attracted to the institutions. Expanded extension programs and credit by examination alternatives promise to be very effective methods of serving this new clientele because such options help to reduce the most important constraint to the participation of adults -- the cost of their time.

Richard Freeman (1976) has persuasively argued that the returns to college education, which soared in the 1960's, have begun a secular decline. Although one can question whether the effects are, in fact, entirely the result of long term forces, the observed increase in high school drop-out rates and fall in college enrollment rates suggest that the response to altered expectations about the returns from education can profoundly affect the pool of students who actually enroll.[10]

But families and prospective students not only must contemplate the prospect of decreasing monetary returns from higher education. Students are also confronting the increasing costs of their own time. Much of the recent research in the economics of the family has emphasized that consumers respond to this increasing time cost by substituting relatively cheaper goods and services for their own time (explaining, in part, the increase in meals taken out or use of microwave ovens over traditional meal preparation and consumption).

Higher education has afforded few opportunities for individuals to economize on their use of time.[11] The evidence suggests a continuing

effort by students to reduce investment costs, through whatever means are available. For example, in the 1970's, the share of freshman enrollments in the public sector has increased from 60 to 80 percent. Further, over this same period part-time enrollments, even among traditional, college aged students, have increased at nearly twice the rate of full-time enrollments. Even the increasing share of enrollments in "higher priced" proprietary institutions can be partly attributed to shorter program duration, and hence, lower time costs.

In sum, the prospects of declining enrollments, declining returns to students, and an increased enrollment sensitivity to all student investment costs would seem to work toward <u>increased</u> pressure for time-shortening, and flexible credit by examination, alternatives. With these more basic influences in mind, a set of four partly overlapping research studies are proposed. This research agenda includes studies which would fill in many of the information gaps about the potential benefits and costs of credit by examination. Some parts of the suggested research would extend the findings of studies already completed. By focusing on aspects of student and institutional behavior, the several projects would yield results which can be used to more precisely gauge the potential private and social economic impacts.

Study 1: Dimensions of Student Participation and Net Benefits

<u>Rationale</u>. No good estimate of the potential impact of credit by examination options has been developed. Most studies to date provide figures based on faulty assumptions or are too narrowly drawn. In effect, this study would be an attempt to produce "order of magnitude"

estimates of the net monetary benefits of credit by examination for students, institutions, and states under a reasonable set of alternate assumptions. No estimates of induced student or institutional responses would be sought, although alternative assumptions could be employed.

Design. The study would require a simulation of the participation in credit by examination programs along with associated financial effects. Similar estimates are frequently prepared, using "planning models," to obtain estimates of alternatives for national student aid and income support programs (see, for example, Wagner 1978). The following variables need to be specified:

a. maximum number of potential test takers

b. distribution of credit hours earned (by sector?)

d. student response assumptions

(1) enroll for precisely fewer hours

(2) enroll for fewer hours at same rate as, say, Florida or New York students

Reported results:

a. aggregate student tuition savings, increased earnings

b. aggregate lost institutional revenue (at average institution or state)

c. aggregate public subsidy savings (institutional and student)

Study Costs.

Senior Researcher: 1/8 man year

Research Assistant: 1/8 man year

Data Processing: $1,000 (no new data collection)

udy 2: Student Response to Credit by Examination Options

Rationale. The identification of potential economic impacts of edit by examination revealed that the nature and extent of costs and nefits critically depend upon how students respond. The analysis student response, along several dimensions, is fragmentary at st. In effect, this study would consist of a set of smaller studies deling initial and continued student response to credit by examination ternatives. Six dimensions, or sub-studies, of student response e proposed:

a. induced enrollment

b. choice of institution

c. choice of field

d. accelaration

e. mix: credit by exam and attendance status

f. retention

e results of the studies would fill important gaps in information. hout better analysis, the presumed benefits and costs for students, stitutions, and states cannot be estimated. Among the questions be answered are:

Are potential students more likely to enroll with expanded credit by examination options?

Do differences in enrollment response emerge among different types of students (traditional, adult)?

Does the credit by examination option induce students who would have enrolled elsewhere to attend participating institutions?

Does the credit by examination option induce students to choose an associated field of study?

What student, institution, or program attributes are associated with decisions to advance the date of graduation as opposed to upgrading the program of study?

How do credit by examination options affect enrollment patterns? Will prospective students with awarded credit elect more part-time study or shift from part-time to full-time status?

How does credit by examination independently affect the student persistence through postsecondary education?

How does an expanded credit by examination program affect the enrollment or degree completion rates of adults, low income, or disadvantaged individuals?

Design. Studies (a) through (c) can utilize the theoretical and empirical developments in the growing number of enrollment demand studies (see Jackson and Weathersby 1975). Bishop and Van Dyke (1975) have developed the only estimates of the determinants of postsecondary enrollment demand of adults -- a group of special interest for credit by exam. As Dresch (1975a) points out, however, many of the demand models are misspecified and suffer from insufficient data to accurately estimate enrollment response. None, for example, consider the actual cost of student time, save through a response to unemployment rates (see, however, Dresch 1975b and Wachtel 1975).

Also relevant is the literature on rates of return to higher education, particularly McMahon, Hoang, and Wagner's 1976 study of expected rates of return by intended occupation. McMahon, et. al.

calculated a rate of return for each individual in their sample, using actual direct and indirect investment costs.

Finally, persistence can be viewed, in economic theory, as adjustments toward the longer run household investment equilibrium. Student and institutional attributes, including programs such as credit by examination which affect the cost of student time, heavily influence the speed with which the long run equilibrium position is either attained and/or modified. A more detailed summary of the analytical framework can be found in Wagner (1977).

The study would require longitudinal data on a sample of potential students (all ages). Family economic and demographic data, institutional attributes, and measures of student responses just described would be necessary. It might be advantageous and cost effective to limit the study to an active state such as Florida (for CLEP) or New York. This strategy would also partly control for simultaneous differences in the supply of credit by examination opportunities, at least across states. Generalizing the results beyond the state would be difficult, since nonresident students might use the option only in the absence of similar programs in their own states.

Studies (a) through (c) could be based on a one-time panel survey. Studies (d) through (f) might use retrospective, current, and prospective information collected from a sample of identified freshmen surveyed once two years later. Without question, a true longitudinal study would provide more accurate data, although only at greater costs.

Study Costs:

Studies (a), (b), and (c)*

Senior Researcher: 1 man year

Research Assistant: 1½ man years

Data Collection and Data Processing: $25,000

Studies (d), (e), and (f)*

	One-time survey	Longitudinal
Senior Researcher:	1 man year	1½ man year
Research Assistant:	1½ man years	3 man years
Data Collection and Data Processing:	$25,000	$60,000

*Estimates for the three sub-studies, jointly undertaken. Little savings would be realized for carrying out one sub-study within each set.

Study 3: Student Outcomes

Rationale. The economics of education literature reveals a considerable amount of disagreement about "whether college matters." (see Solmon and Taubman 1973, Taubman and Wales 1974, and Blaug 1976). While many of the differences reported in the literature can be reconciled, the implications for the use of credit by examination are important. If the degree is a credential, with academic content not rewarded in the workplace, then the role of credit by examination as a more efficient assessment mechanism increases.

Design. This study requires data collected in the early working years from a sample of graduates with CLEP credit. A recursive model,

similar to those developed in studies of the earnings function, might be used. (Psacharopoulos (1975) provides a useful review of this work). The sample could be drawn from an individual institution, state, or the CLEP applicant file. In effect, differences in earnings between those with CLEP credit who accelerate and those who elect not to graduate early will be studied.

Study Costs.

Senior Researcher: 9 man months

Research Assistant: 1 man year

Data Collection and
Data Processing : $25,000

Study 4: Institutional/Faculty Response to Credit by Examination Alternatives

Rationale. Some institutions and/or academic departments have fully embraced the concept of credit by examination while others have not. Since the institution's supply of credit by examination options will affect the ultimate use of the program, the underlying influences on institution (and department) participation in credit by examination options should be explored. Specific questions to be addressed include:

Which institution or faculty attributes appear to be associated with the adoption or emphasis of credit by examination (e.g., size, sector, urban, selective)?

Does the state funding mechanism in the public sector appear to influence the adoption and use of credit by examination?

How easily are credits earned through examination substituted for regular course credit (e.g., in transferring from other

institutions)?

Design. The general problem and questions can be considered in an institutional decision-making context (see, for example, Wagner and Rice 1977 or Williamson 1963). Aspects of faculty decision-making at the departmental level, including responses to potential enrollment declines as well as incentives, are considered by Hoenack (1977b).

An examination of the use of credit by examination in states and at institutions over time, using simple regression techniques, might provide some useful estimates of the significance of potential influencing variables. State funding mechanisms, changes in institutional enrollments, and other attributes might be included. The study would consider not only the influences on the adoption of credit by examination, but also the likely effects of credit by examination, through enrollment changes, on institutional goals and instructional, student aid, or research budget constraints.

Since good, comparable cost data at the academic department level are not currently available, one or two "controlled" experiments might be attempted with individual "reluctant" departments. The effects of various types of inducements on the adoption of credit by examination could be assessed (along the lines suggested by Hoenack 1977a).

Study Costs.

	Time Series	Experiment
Senior Researcher	1/2 man year	3/4 man year
Research Assistant	1/2 man year	1/2 man year
Incentive Subsidies		$10,000
Data Collection and Data Processing	$7,500	$5,000

REFERENCES

Arbolino, Jack N. "No Matter Where You Learned It: The 10-Year Promise of the College-Level Examination Program," College Board Review 99 (Spring 1976): 13-20.

Becker, Gary S. Human Capital, Second Edition. New York: National Bureau of Economic Research, 1975.

Bersi, Robert M. and Harp, Mary Ann. "Restructuring the Baccaulareate: A Focus on Time-Shortened Degree Programs in the United States." Washington, D.C.: American Association of State Colleges and Universities, 1973.

Bishop, John and Van Dyke, Jane. "Can Adults Be Hooked on College? Some Determinants of Adult College Attendance." Mimeographed. Madison, Wisconsin: University of Wisconsin Institute for Research on Poverty, 1975.

Blaug, Mark. An Introduction to the Economics of Education. Baltimore: The Penguin Press, 1972.

_____. "Human Capital Theory: A Slightly Jaundiced View," Journal of Economic Literature 14 (September 1976): 827-855.

Boulding, Kenneth E. "The Management of Decline," Change 7 (June 1975): 8ff.

Bowen, Howard R. "Time, Informal Learning, and Efficiency in Higher Education," Education Record (Fall 1973) 54: 271-280.

Boyer, Ernst L. "Shorter Time for Undergraduate Degrees." In Higher Education: Myths, Realities and Possibilities, edited by Winfred Godwin and Peter D. Mann. Atlanta: Southern Regional Educational Board, 1972.

Caldwell, Edward. "In-College Effects of Acceleration by Examination," Journal of College Student Personnel (September 1977): 399-402.

Carnegie Commission on Higher Education. Less Time, More Options: Education Beyond High School. New York: McGraw-Hill Book Company, 1971.

_____. The More Effective Use of Resources. New York: McGraw-Hill Book Company, 1972.

Carnegie Council on Policy Studies in Higher Education. More Than Survival: Prospects for Higher Education in a Period of Uncertainty. San Francisco: Jossey-Bass, 1975.

Casserly, Patricia L. "College-Level Examination Program: Its Meaning To Participants." College Entrance Examination Board Research and Development Report, No. 6. Princeton, New Jersey: Educational Testing Service, 1973.

Crary, Lowell L. and Leslie, Larry L. "The Private Costs of Post-secondary Education." Mimeographed. Tucson: University of Arizona, 1977.

Cross, K. Patricia, Valley, John R., and Associates. Planning Non-Traditional Programs: An Analysis of Issues for Postsecondary Education. San Francisco: Jossey-Bass, 1974.

Darnes, Robert G. "The Economics of Credit by Examination." Mimeographed. Rockford: Rockford College, April 1975.

Dresch, Stephen P. "A Critique of Planning Models for Postsecondary Education," Journal of Higher Education 46 (May/June 1975a): 245-286.

_____. "Impact of Student Aid and Labor Market Conditions on Access to Postsecondary Education. Technical Proposal." Mimeographed. New Haven: Institute for Demographic and Economic Studies, June 1975b.

Dunkelberg, William C. and Stephenson, James B. "The Rate of Return on Investments in Durable Goods." Mimeographed. West Lafayette: Purdue University, n.d.

Enger, John M. and Whitney, Douglas R. "CLEP Credit and Graduation: A Four-Year Study at the University of Iowa," College and University 49 (Spring 1974): 236-241.

Freeman, Richard B. The Overeducated American. New York: The Academic Press, 1976.

Froomkin, Joseph. Recent Developments in Postsecondary Education. Washington, D.C.: Joseph Froomkin, Inc., January 1976.

Fund for the Advancement of Education. "They Went to College Early." Evaluation Report No. 2. New York: Fund for the Advancement of Education, 1957.

Furlong, Thomas Edward. "The Perceptions of Selected Groups of University and Community College Administrators of the College-Level Examination Program and Its Implications for the State Universities and Community Colleges of Florida." Ph.D. dissertation, Florida State University, 1977.

Grandy, Jerilee and Shea, Walter M. The CLEP General Examinations in American Colleges and Universities. Princeton, New Jersey: College Entrance Examination Board, 1976.

Henderson, Cathy. "Changes in Enrollment by 1985." Policy Analysis Service Reports, No. 1. Washington, D.C.: American Council on Education, June 1977.

Hoenack, Stephen A. "An Agenda of Research Projects on the Financing of Higher Education." Mimeographed. Minneapolis: University of Minnesota, July 1977a.

_____. "Direct and Incentive Planning Within a University," Forthcoming, Socio-Economic Planning Sciences 11, 1977b.

Hyde, William D. "The Effect of Tuition and Financial Aid on Access and Choice in Postsecondary Education." Mimeographed. Denver: Education Commission of the States, 1977.

Jackson, Gregory A. and Weathersby, George B. "Individual Demand for Higher Education: A Review and Analysis of Recent Empirical Studies," Journal of Higher Education 46 (November/December 1975): 623-652.

Jamison, Dean T. and Wolfe, Barbara Burgess. "The Economics of Experiential Learning Programs," Findings 3 (1976): 5-8.

Jencks, Christopher. Inequality. New York: Harper and Row, 1972.

Kimmel, Ernst W. "Financing Credit by Examination: A Framework for Discussion." Mimeographed. Princeton, New Jersey: Educational Testing Service, October 1976.

Kreplin, Hannah. "Credit by Examination: A Review and Analysis of the Literature." Berkeley: University of California, 1971.

Lazear, Edward. "Education: Consumption or Production?" Journal of Political Economy 85 (June 1977): 569-577.

Leibowitz, Arleen. "Education and the Allocation of Women's Time." Education, Income, and Human Behavior edited by F. Thomas Juster. New York: McGraw-Hill Book Company, 1975.

McMahon, Walter W., Hoang, Nguyen, and Wagner, Alan P. "Returns to Investment in Higher Education." Mimeographed. Urbana: University of Illinois, 1976.

McCluskey, Jimmy. "Financing Credit by Examination: Issues and Implications." Mimeographed. Arkansas State University, n.d.

McCluskey, Jimmy and Richmond, Mossie J. "Summary Report on Arkansas State University's Participation in the College-Level Examination Program (CLEP): 1971-75." Mimeographed. Arkansas State University, n.d.

Meinert, Charles W. "Time-Shortened Degrees." ERIC Higher Education Research Report, No. 8. Washington, D.C.: American Association For Higher Education, 1974.

Michael, Robert T. The Effect of Education on Efficiency in Consumption. New York: National Bureau of Economic Research, 1972.

Moughamian, Henry. "Financing Credit by Examination: Issues and Implications." Mimeographed. Chicago: City Colleges of Chicago, October 1976.

Nelson, Fred A. "Has the Time Gone for an External Degree?" Journal of Higher Education 45 (March 1974): 174-183.

O'Hearne, John J. "New College Scholarships: Rewards in the Coin of the Realm," College Board Review 83 (Spring 1972): 22-24.

Psacharopoulos, George. Earnings and Education in OECD Countries. Paris: OECD, 1975.

_____. Returns to Education. San Francisco: Jossey-Bass, 1973.

Radloff, Barbara. "Time-Shortening: An Idea Whose Time Has Come -- and Gone?" Carnegie Quarterly 25 (Winter 1977): 1-3.

Ruyle, Janet and Gerselman, Lucy Ann. "Non-Traditional Opportunities and Programs." In Planning Non-Traditional Programs: An Analysis of Issues for Postsecondary Education edited by K. Patricia Cross, John R. Valley, and Associates. San Francisco: Jossey-Bass, 1974.

Schultz, Theodore W. Investment in Human Capital. New York: Free Press, 1971.

Sharon, Amiel T. "College Credit for Off-Campus Study." ERIC Higher Education Research Report, No. 6. Washington, D.C.: American Association for Higher Education, 1971.

_____. "A Model for Awarding College Credit for Work Experience," Journal of Higher Education 47 (November/December 1976): 701-710.

Shea, Walter M. "Comments on CLEP Test Center Report, 1976-77." Mimeographed. Princeton, New Jersey: Educational Testing Service, August 1977.

Smart, John M. and Evans, Charles. "State Policy-Makers and Time-Shortened Degrees," Journal of Higher Education 48 (March/April 1977): 202-215.

Solmon, Lewis and Taubman, Paul, editors. Does College Matter? New York: Academic Press, 1973.

Stallings, William M., Aleamoni, Lawrence M., and Heil, D.K. "The University of Illinois Placement and Proficiency System: Description and Results," Journal of Higher Education 43 (November 1972): 610-619.

Stark, Joan M. "The Three Year B.A.: Who Will Choose It? Who Will Benefit?" Journal of Higher Education 44 (December, 1973): 703-715.

Summers, Anita A. and Wolfe, Barbara L. "Do Schools Make A Difference?" American Economic Review 67 (September 1977): 639-652.

Taubman, Paul and Wales, Terrance. Higher Education and Earnings. New York: McGraw-Hill Book Company, 1974.

Trivett, David A. "Credit for Prior Off-Campus Learning." ERIC Higher Education Research Report, No. 2. Washington, D.C.: American Association for Higher Education, 1975.

Vickery, Clair. "Time-Poor: A New Look at Poverty," Journal of Human Resources 12 (Winter 1977): 25-48.

Wachtel, Paul. "The Returns to Investment in Higher Education: Another View." Education, Income, and Human Behavior, edited by F. Thomas Juster. New York: McGraw-Hill Book Company, 1975.

Wagner, Alan P. "Financing Postsecondary Learning Opportunities Through Existing Federal Student Aid Programs," School Review (Forthcoming May 1978).

Wagner, Alan P. "Student Persistence Through Postsecondary Education: Patterns, Influences, and Implications for Public Policy. Research Proposal." Mimeographed. West Lafayette: Purdue University, 1977.

Wagner, Alan P. and Rice, Lois D. Student Financial Aid: Institutional Packaging and Family Expenditure Patterns. Washington, D.C.: College Entrance Examination Board, 1977.

White, Edward M. "Four Issues for Faculty in Equivalency Testing," College Board Review 100 (Fall 1976): 25-29.

Williamson, Oliver. "Managerial Discretion and Business Behavior," American Economic Review 53 (December 1963): 32-57.

NOTES

1. Education also provides current consumption returns to the student -- Bowen's (1973) "agreeable experiences" -- and parents. However, the investment (particularly future earnings) aspects are probably the more important returns (Lazear 1977).
2. Generally, it is inappropriate to include "savings" on room and board in these calculations, since these expenses will be incurred whether or not the student is in attendance.
3. This is not to say there may not be other savings, such as reduced study time to permit greater part-time work or leisure activities. Rather, the use of credit by exam does not necessarily reduce the direct costs of investment, even if the academic course load is lightened.
4. To illustrate, the individual who begins work one year earlier than his peers and retires one year sooner receives $10,000 in current dollars and loses, say, $2,000 in current dollars ($25,000 income in working year 44 discounted at 6 percent per year to the present). The individual who begins work at the same date as his peers, but works one year longer, receives simply $2,000 (in present value).
5. Froomkin (1976) found that the one-third of all colleges experiencing a decline in enrollments from 1970-71 to 1973-74 also faced rising average costs -- a finding consistent with either scale economies or sizeable fixed costs in the short run.

6. Moughamian (1976) notes that state funding, in some cases, is based on mid-term enrollment. Lower attrition "protects" the public subsidies in such cases.
7. By applying distributional "weights" to the enrollments of students from different income classes, an index of the weighted enrollments can be valued and added to other returns in evaluating the effects of the project.
8. See Henderson (1977) for a projection of enrollments by state to 1985.
9. For a general limited discussion of these issues, see the Carnegie Council's More Than Survival (1975).
10. Indeed, without the dramatic growth in student aid subsidies through 1977, the fall in enrollment rates would probably have been much greater.
11. Vickery (1977) provides a general statement of the potential costs when the substitution between goods and time is limited.